U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-277 854

A National Environmental/Energy Workforce Assessment. Maryland

National Field Research Center, Inc, Iowa City, Iowa

Prepared for

Environmental Protection Agency, Washington, D C

Dec 77

PB 277 85

A National Environmental/Energy Workforce Assessment

Conducted by:

National Field Research Center, Inc.

P.O. Box 287

Iowa City, Iowa 52240

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO. PB277854
4. TITLE AND SUBTITLE A NATIONAL ENVIRONMENTAL/ENERGY WORKFORCE ASSESSMENT, Maryland		5. REPORT DATE December 1977 - Date of Completion 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) National Field Research Center, Inc.		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Field Research Center, Inc. P.O. Box 287 Iowa City, Iowa 52240		10. PROGRAM ELEMENT NO. 2BC651 (36) 11. CONTRACT/GRANT NO. Grant #T900591010
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Federal Activities (A-104) 401 M Street, S.W. Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED Phase I Final Report 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES Phase II will comprise approximately five volumes and will be available in September 1978. Phase III will be available in September 1979.

16. ABSTRACT

This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS		b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Planning	Employment	National Environmental/Energy Workforce Assessment	
Regional Planning	Economic Surveys		
State Planning	Energy Management		
State Agencies	Pollution Control		
Federal Government Planning	Environmental Management		
	Environmental Education		
Labor Force	Environmental Sciences		
Manpower	Conservation		
Forecasting	Environment		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report)	21. NO. OF PAGES
Release Unlimited		124
	20. SECURITY CLASS (This page)	22. PRICE PCA06 MFA01

EPA Form 2220-1 (9-73)

NATIONAL ENVIRONMENTAL/ENERGY

WORKFORCE ASSESSMENT

for

MARYLAND

Conducted by:

NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591010

1977

This document has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

National
Field
Research
Center, Inc.

Box 287 Iowa City, Iowa 52240 (319) 351-8789

INTRODUCTORY NOTE

The National Environmental/Energy Workforce Assessment was conducted by National Field Research Center, Inc. with main offices in Iowa City, Iowa. The following personnel have had primary responsibility for the Assessment and project report.

IOWA CITY, IOWA
Dr. Darold E. Albright, President
Paul E. Bridges, Executive Director
Dr. Richard L. Benesh, Project Director
Judith J. Gordon
Alan M. Stowell
Anita M. Stowell
Mary Kay (Edge) Wade

ATLANTA, GEORGIA
Elizabeth G. Nielsen, Regional Director
Robert Oxberger

DENVER, COLORADO
Nancy C. Dillenberg, Regional Director

SEATTLE, WASHINGTON
Steven Silva, Regional Director

WASHINGTON, D.C.
Frank E. Smith, Project Coordinator
Lloyd B. Chaisson, Assistant Project Coordinator
Jack F. Seum

Additional research and clerical assistance was provided by Frederick M. Wall, Maxine Wolfe, Margaret Fehn, Sandra Hogsed, Karen Kirchoff, Sharon Leiker, Marilyn Low, Mary McCormac, and Joan Urquhart.

FIELD OFFICES

ATLANTA
2700 Cumberland Pkwy
Suite 150
Atlanta, GA 30339
(404) 433-2644

DENVER
2600 S. Parker Rd.
Suite 180, No. 6
Denver, CO 80232
(303) 751-4962

SEATTLE
927 United Pacific Bldg.
1000 2nd Ave
Seattle, WA. 98101
(206) 623-9170

WASHINGTON D.C.
1522 K Street, N.W.
Suite 600
Washington, D.C. 20005
(202) 223-9138

TABLE OF CONTENTS

	Page
ILLUSTRATIONS	iii
ACKNOWLEDGEMENT	v
PREFACE	vi
FOREWORD	vii
STATE SUMMARY	1
STATE PROFILE	13
POLLUTION CONTROL AND ABATEMENT AGENCIES	16
POLLUTION CONTROL AND ABATEMENT PROGRAMS	19
I. Air	20
II. Noise	32
III. Pesticides	36
IV. Potable Water	45
V. Radiation	56
VI. Solid Waste	62
VII. Wastewater	72
VIII. Energy	89
SELECTED POST SECONDARY INSTITUTIONS WITH FORMAL ENVIRONMENTAL/ENERGY PROGRAMS	94
STATE LEGISLATION	100

NOTE: The Selected Bibliography is appended to each Regional Report.

ILLUSTRATIONS

Figure		Page
1	Maryland State Department of Health and Mental Hygiene	18
2	Maryland State Department of Health and Mental Hygiene, Bureau of Air Quality and Noise Control	31
3	Maryland Department of Natural Resources, Water Resources Administration	88

Table		
I	Maryland Department of Health and Mental Hygiene, Bureau of Air Quality and Noise Control, Air Programs, Current (1976) Staffing Level	23
II	Department of Health and Mental Hygiene, Laboratories and Research Administration, Air Quality Laboratory, Current (1976) Staffing Level	24
III	State of Maryland, Local Pollution Control and Abatement Agencies, Current (1976) Staffing Level	26
IV	Maryland Pesticide Control, Current (1976) Staffing Levels for Public and Private Sectors (est.)	39
V	State of Maryland, Department of Health and Mental Hygiene, Division of Water and Sewage, Current (1976) Staffing Level	47
VI	State of Maryland, Certified Treatment Operators (est.)	49
VII	State of Maryland, Environmental Health Administration, Potable Water Program Operations, Workforce Projections to 1982 (est.)	50

Table		Page
VIII	Maryland Department of Health and Mental Hygiene, Environmental Health Administration, Bureau of Food and Drug, Division of Radiation Control, Current (1976) Staffing Level (est.)	58
IX	Maryland Department of Health and Mental Hygiene, Division of Radiation Control, Workforce Projections to 1982 (est.)	60
X	State of Maryland, Department of Health and Mental Hygiene, Division of Solid Waste Control, Current (1976) Staffing Level	65
XI	State of Maryland, Pyrolysis Resource Recovery Solid Waste, Current (1976) Staffing Level	66
XII	Department of Health and Mental Hygiene, Division of Solid Waste Control, Workforce Projections to 1982 (est.)	69
XIII	Department of Public Health and Mental Hygiene, Bureau of Sanitary Engineering, Current (1976) Staffing Level	75
XIV	Maryland Department of Natural Resources, Water Resources Administration, Current (1976) Staffing Level	76
XV	State of Maryland, Certified Treatment Plant Operators, Current (1976) Staffing Level	77
XVI	State of Maryland, Current (1976) Wastewater Workforce	79
XVII	Maryland Department of Public Health and Mental Hygiene, Wastewater Program Operations, Projected Staffing Level to 1982 (est.)	81
XVIII	State of Maryland, Water Resources Administration, Workforce Projections to 1982 (est.)	82
XIX	State of Maryland, Treatment Plant Operators, Potable Water/Wastewater, Workforce Projections to 1982 (est.)	83
XX	State of Maryland, Energy Policy Office, Current (1976) Staffing Level	91

ACKNOWLEDGEMENT

Valuable support and assistance for this report were provided by the Maryland Department of Health and Mental Hygiene's Environmental Health Administration. Appreciation is extended to Mr. Jack Kerns of the Environmental Health Administration who provided helpful overviews of the Environmental Health Administration's programs and anticipated initiatives. Assistant Attorney General Warren Rich also provided an interesting insight into the pollution control and abatement regulatory programs from a legal perspective.

Mr. Thomas A. Towers and Mr. George Ferrari of the Bureau of Air Quality and Noise Control contributed information concerning both the air and the noise pollution situations in the state. Mr. Walter Miles and Mr. Wayne Amato of the Division of Solid Waste Control provided an overview of the state's solid waste management program.

Mr. Raymond Anderson of the Division of Water and Sewerage provided valuable information that was helpful in preparing this report on the state's water supply and wastewater pollution control and abatement effort. Mr. Robert Corcoran of the Division of Radiation Control provided insights on the state's radiation control program.

An overview of the pesticide regulatory program was provided by Mr. David Shriver of the Division of Plant Industries. The involvement of the Water Resources Administration in protecting the state's water resources was described by Mr. John D. Twining, Deputy Director of that Administration. Training information was generously provided by Mr. Andy Holton of the Environmental Health Administration and Mr. David Shrader of the Department of Natural Resources.

PREFACE

This report presents existing workforce levels, training programs, and career potentials and develops staffing level projections (1976 - 1981) based on available information for the State of Maryland in the environmental pollution control areas of air, noise, pesticides, potable water, radiation, solid waste, wastewater, and energy. This study was carried out for the United States Environmental Protection Agency by National Field Research Center of Iowa City, Iowa.

The information and data presented in this report were compiled in large part from extensive interviews with professionals working in the respective areas and were supplemented by telephone surveys and research.

FOREWORD

The material herein contains the information and data collected for eight individual pollution control inventories conducted for Maryland. The format includes workforce profiles, projections, growth and career potential for each of the areas investigated. Growth projections are necessarily based on best professional estimates developed from available information and represent what are felt to be realistic figures by experts in the respective areas. The pollution control areas considered by this study are as follows:

Air

Noise

Pesticides

Potable Water

Radiation

Solid Waste

Wastewater

Energy

National Environmental Energy
Workforce Assessment

Phase I

MARYLAND

State Summary

I. AIR

Maryland's air pollution abatement and control functions are the principal responsibility of the Bureau of Air Quality and Noise Control in the Department of Health and Mental Hygiene. The Bureau has a central office in Baltimore and two regional offices. The Bureau has four divisions plus a Noise Section which include Divisions of Program Planning and Analysis, Engineering, Compliance, and Air Monitoring. There are also ten local air pollution control programs in Maryland.

The Bureau has a current total of 84 persons, and professions represented include public health engineers, environmental health assistants, sanitarians, and occupational specialists. Most of the Bureau's professional staff engineers have Master's degrees. Approximately 110 persons with air pollution control responsibilities are presently employed by local programs.

Budget constraints are not likely to increase the staff of either the state or local air pollution control programs by 1982. Bureau officials project that their present staffing level will remain the same but there is a possibility that there may be an increase in technicians if a motor vehicle inspection/maintenance program is initiated. About 120 persons annually attend two visible emission certification sessions sponsored by the Bureau. Bureau staff receive on-the-job training and those who do participate in long-term training for Master's degrees usually obtain them from the University of Maryland or the Johns Hopkins School of Public Health.

II. NOISE

Noise pollution control activities are carried out by the Bureau of Air Quality and Noise Control. The Bureau's Noise Control Section is under the jurisdiction of the Maryland Department of Health and Mental Hygiene. Baltimore, Cumberland, and Rockville all have nuisance ordinances, but they do not include acoustical criteria. Baltimore has adopted zoning noise ordinances which include acoustical criteria but none are included in the city's recreational/vehicle ordinances. The state is responsible for enforcing statewide legislation which applies to regulating motor vehicle mufflers and noise levels across property lines.

The Noise Control Section primarily investigates complaints, performs data analyses, formulates programs, conducts noise surveys, and provides enforcement of statewide noise restrictions. Staff also provide educational assistance to communities in developing model noise ordinances and speak before interested groups. The Section is composed of a public health engineer, a sanitarian, and a clerk. The Section is only specifically authorized to have one position and others are temporarily assigned to assist as needs arise.

State budgetary restrictions are not likely to increase the staffing level of the Noise Control Section by 1982. However, if additional funding does become available, the Section may recruit six technicians to increase its noise monitoring capability. The anticipated availability of federal funds may allow the Section to recruit a sanitarian and an environmental health aide for initiating a labeling program.

III. PESTICIDES

The Maryland Pesticide Applicators Law of 1975 was enacted to comply with the requirements of the Federal Fungicide, Insecticide, and Rodenticide Act (FIFRA) as amended. The U.S. Environmental Protection Agency (EPA) designated the Maryland Department of Agriculture as the lead agency for implementing the training and certification requirements of FIFRA.

Five employees of the Department's Division of Plant Industries have direct involvement with the pesticide applicator training and certification program. Professions represented include a supervisor, three entomologists and an inspector. Two training specialists of the University of Maryland's Cooperative Extension Service provide training with the assistance of nineteen county extension training agents.

In order to enforce state and local legislation, two additional field inspectors are needed by 1980. In addition, two entomologists, chemists, and/or plant pathologists are expected to be recruited by 1982.

The Maryland pesticide program is not anticipated to grow significantly by 1982. Most career potential is projected to exist with commercial applicator businesses.

IV. POTABLE WATER

The state of Maryland intends to assume primary enforcement responsibilities for the federal Safe Drinking Water Act (SDWA). The state currently has 360 public water supply treatment plants, with an additional 440 plants soon to be brought under the jurisdiction of the Act.

The Department of Health and Mental Hygiene's Environmental Health Administration has responsibility for the state's public water supplies. The Department of Natural Resources' Water Resources Administration has permitting responsibilities and develops comprehensive water and sewage plans.

There are about 670 full-time personnel employed at 363 water treatment plants. Because of increased construction and staffing demands, a continual upgrading of treatment plant personnel skills are required. Most operator training is funded by the state rather than the federal government.

The availability of federal funds as a consequence of preparation for the assumption of primacy for SDWA will allow the Environmental Health Administration to increase the drinking water program staff by 400 percent during fiscal year 1977. Positions included are sanitarians, public health engineers, and environmental health aides (technicians). The number of certified treatment plant personnel is also expected to increase as many operators of small water supply systems will be required to obtain certification.

Training for Water Section personnel of the Environmental Health Administration is primarily on-the-job.

V. RADIATION

Radiation control responsibilities fall under the jurisdiction of the Department of Health and Mental Hygiene's Environmental Health Administration. The Division of Radiation Control has recently acquired legislative authority to initiate a program to control sources of non-ionizing radiation since it already has a program to license and regulate X-ray devices. Maryland is an agreement state with the Nuclear Regulatory Commission (NRC).

Environmental Radiation surveillance activities are the responsibility of the Division's Licensing and Inspection Section. The other section is the X-ray Section. The Division is composed of a chief, three radiation specialists, five health physicists, one environmental health aide and a secretary. A public health radiation specialist and two health physicists are anticipated to be recruited in the next five years (1977-1981) to staff a new section that will be responsible for inspecting and regulating sources of non-ionizing radiation.

Career potential is likely to develop slowly in the public sector and few additional personnel are expected to be recruited for radiological health or environmental radiation control activities. The new state program to control sources of non-ionizing radiation constitutes the only reason why more personnel will be hired by the Division. Career potential is also anticipated to be low in the next five years since the two nuclear power plants currently under construction are not expected to become operational until after 1985.

VI. SOLID WASTE

The Division of Solid Waste Control under the State Health Department's Environmental Health Administration has responsibility for the state's permit program to regulate the disposal of solid waste. About 90 percent of the solid waste generated in Maryland is disposed of by local county governments.

The new Federal Resource Conservation and Recovery Act will enable the Division to recruit chemists, chemical engineers, geologists, and environmental health technicians in the next five years. The Water Resources Administration is anticipated to recruit ten additional planners as a result of hazardous waste legislation to conduct water quality monitoring studies.

State officials anticipate that the principal demand for jobs as a consequence of the new federal act will be in the private sector. Industrial chemical plants are expected to recruit chemists or chemical engineers to conduct research. The Division is encouraging a regionalization program of consolidating landfill sites and additional landfill sites are anticipated to be constructed in the near future, thereby creating a demand for bulldozer operators. Baltimore operates a pyrolysis resource recovery plant which may employ up to fifty people (now employs 34) operating on a twenty-four hour basis if the facility proves to be economically feasible. Such facilities still have to secure markets for the sale of their products, and these markets have been very slow in developing.

VII. WASTEWATER

In Maryland, wastewater pollution control activities are divided between two agencies: the Department of Public Health and Mental Hygiene (Environmental Health Administration) and the Department of Natural Resources (DNR) Water Resources Administration. The Water Resources Administration has authority for issuance of NPDES permits and for 303E River Basin Planning. The Environmental Health Administration has authority over the other water quality assurance programs mandated under the Federal Water Pollution Control Act.

Both the Environmental Health Administration and the Water Resources Administration are expected to increase their staffing levels substantially over the next five years. The Environmental Health Administration's water quality program is expected to increase as additional engineering personnel will be required to assist present personnel assigned to the Construction Grants Unit through Fiscal Year 1981. EHA is actively recruiting chemists, engineers, and sanitarians for their construction grants review program. The Water Resources Administration is also recruiting additional chemists and public health engineers to complement their staff due to the recent passage of state legislation dealing with flood control, hazardous waste and surface mining.

It is evident that the construction grants program will create a demand for qualified operators to operate these relatively complex treatment facilities. The wastewater treatment plant workforce has increased by 58 percent over the past three years and many operators are expected to retire, thus creating an additional demand for personnel.

VIII. ENERGY

The Maryland Energy Policy Office was created by Executive Order of the Governor to allocate petroleum products according to the federal mandatory petroleum allocation program. In July, 1977, the Maryland Energy Policy Office is expected to undergo a reorganization and become part of the Maryland Department of Natural Resources.

The Office is presently staffed with a total of twelve persons including two vacancies. It is anticipated that the Energy Policy Office will have to expand its present staff if it is to handle the programs which it has obtained from federal agencies or which are anticipated to be obtained. Most of the program expansion will be based upon federal grant money. Program administrators anticipate that eight additional personnel may be hired in 1977 to implement additional project responsibilities that have been recently acquired. In order to implement the Office's solar energy research and development grant program, three or four engineers may be recruited. At least one of these engineers must have expertise in the solar energy development field. In addition, a public information officer and several administrative support personnel may be also recruited. Projections beyond 1977 were impossible to obtain because of the program officials' uncertainty regarding the effect of the planned reorganization into the Department of Natural Resources.

STATE OF MARYLAND - SUMMARY

National Environmental/Energy Workforce Assessment
Pollution Control & Abatement Personnel
Projected Workforce Requirements (1976-1981)

Environmental Area	1976	1977	1978	1979	1980	1981	%/annum growth (average)
AIR [1]	185	185	185	185	185	185	N/A
NOISE [2]	1	1	1	1	1	1	N/A
PESTICIDES [3]	32	33	34	35	36	36	3%
POTABLE WATER [4]	714	796	909	1,006	1,099	1,193	11%
RADIATION [5]	12	13	14	14	15	15	5%
SOLID WASTE [6]	22	30	36	42	45	48	17%
WASTEWATER [7]	1,282	1,483	1,616	1,775	1,928	2,081	10%
ENERGY [8]	10	20	20	20	20	20	20%
TOTALS	2,258	2,561	2,815	3,078	3,329	3,579	10%

[1]The above includes only state agency, laboratory and municipal personnel.

[2]The above does not include law enforcement agencies or the private sector.

[3]The above includes 32 state staff but does not include 200-250 public agency applicators, 1,400 commercial applicators and 12,000 private applicators who may be certified by October 1977.

[4]The above includes Environmental Health Administration and Water Resource Administration personnel, Baltimore City Health Department personnel and water treatment plant operators of small water plants which have to obtain certification under SDWA.

[5]The above includes only state agency personnel.

[6]The above includes state agency personnel. Private sector figures were not available.

[7]The above includes state agency personnel and certified operators.

[8]The above includes only state energy agency personnel.

EDUCATION

Several Associate of Art environmental curricula are offered through community colleges in Maryland. Garrett Community College, Charles County Community College, and the Community College of Baltimore award associate degrees in environmental programs. The Community College of Baltimore has a two-year program in Environmental Health Technology. Two training options are available: 1) Environmental Sanitation and 2) Air Pollution Monitoring. Students enrolled in these programs receive instruction in basic science, mathematics, and communication concepts as well as training in the specific environmental discipline.

Garrett Community College awards an associate degree in Estuarine Resource Technology. A Pollution Abatement Technology associate degree program is offered through Charles County Community College. A general curriculum in air, wastewater, and solid waste pollution control management techniques is supplemented with instruction in environmental health and laboratory analysis concepts.

A Master program in Environmental Renewable Resources is currently a career option at Frostburg State College. It has been projected that by 1978, the University of Maryland at College Park will offer two advanced degrees in Marine and Estuary Environmental Science. Degree programs are being designed on both the Masters and Doctoral level.

Individual environmental courses are generally available at most colleges in Maryland. No attempt has been made to complete a survey of these courses.

LEGISLATION

The environmental/energy legislation for Maryland was obtained by request from various agency personnel and through various library references. Summaries of the legislation deemed most relevant to the eight subject areas of the workforce assessment were prepared, and are included in the respective state reports. The following list of laws represents virtually all environmental legislation for the state. Only certain of the following laws were summarized; the list is presented to show, by title, the kinds of laws which have been enacted.

Environmental Policy Act

Environmental Service Act of 1970

Air Quality Control Act

Environmental Noise Control Act

Pesticide Applicators Law

Pesticide Registration and Labeling Law

Water Resources Law

Water Pollution Control Laws

Shore Erosion Control Law

Strip Mining Law

National Environmental Energy Workforce Assessment

Phase I

MARYLAND

State Report

13

STATE PROFILE

Maryland includes 10,577 square miles stretching from the Atlantic Ocean to the Allegheny Mountains interrupted by the District of Columbia and Chesapeake Bay, both of which provide significant contributions to the state's economy. The 1975 population was estimated at 4,188,630 and is projected to be 4,507,560. The greatest recent increases in population have been in the Baltimore and Washington metropolitan areas where 84 percent of the population lives. The population increased 26.5 percent between 1960 and 1970. The urban population is over 76 percent.

Maryland is astride the industrial-population complex which extends from Maine to Virginia. The Atlantic Coastal Plain comprises 50 percent of the total area; the Piedmont Plateau reaches to the Catoctin Ridgeline where the Appalachians begin. The southern portion of the coastal plain is sandy; the northern part has fertile loams. The piedmont has good soil with clay deposits used in brickmaking. The western part of Maryland has a typical continental climate; the east is humid sub-tropical. Central Maryland is one long metropolitan area; yet nearly 50 percent of the land area is forested.

Maryland's economy is well diversified. Value added by manufacture annually exceeds $4.7 billion. Important industries include food products, primary metals, electrical equipment, printing and publishing, apparel, and machinery. Per capita income ranked ninth in the country for 1975 at $6,437.

Mineral production totaled $152 million in 1975, led by stone and cement. The fish and shellfish catch averages about $22 million annually. The farm cash crops are dominated by tobacco, followed by corn, soybeans, apples, and tomatoes. Broilers and dairy products contributed heavily to the total farm receipts which equaled $646 million in 1975.

MARYLAND POLLUTION CONTROL AND ABATEMENT AGENCIES

The Maryland Department of Health and Mental Hygiene is the principal state environmental pollution control and abatement agency. This Department has primary responsibility for the state's air, noise, potable water, pesticides, radiation, solid waste, and wastewater pollution control programs. Responsibilities for the water supply and the wastewater programs are divided between the Department of Natural Resources' Water Resources Administration and the Department of Public Health and Mental Hygiene's Environmental Health Administration. The Energy Policy Office has coordinating responsibilities for the management of the state's energy resources.

In the Department of Public Health and Mental Hygiene, pollution control and abatement responsibilities are located in the Environmental Health Administration (EHA). The EHA has three bureaus: the Bureau of Air Quality and Noise Control, the Bureau of Food and Drugs, and the Bureau of Sanitary Engineering.

The Bureau of Air Quality and Noise Control is composed of a Noise Control Section, a Division of Air Monitoring, a Division of Compliance, a Division of Engineering, and a Division of Program Planning and Analysis. The Bureau of Food and Drugs has a Division of Compliance and Enforcement, and a Division of Radiation Control among its six sections.

The Bureau of Sanitary Engineering has responsibilities of a public health regulatory nature for Maryland's solid waste management, water supply and wastewater pollution control programs. It is composed of four divisions and a construction grants unit. The divisions are the Division of General Sanitation, the Division of Planning and Compliance,

the Division of Solid Waste, and the Division of Water and Sewerage.

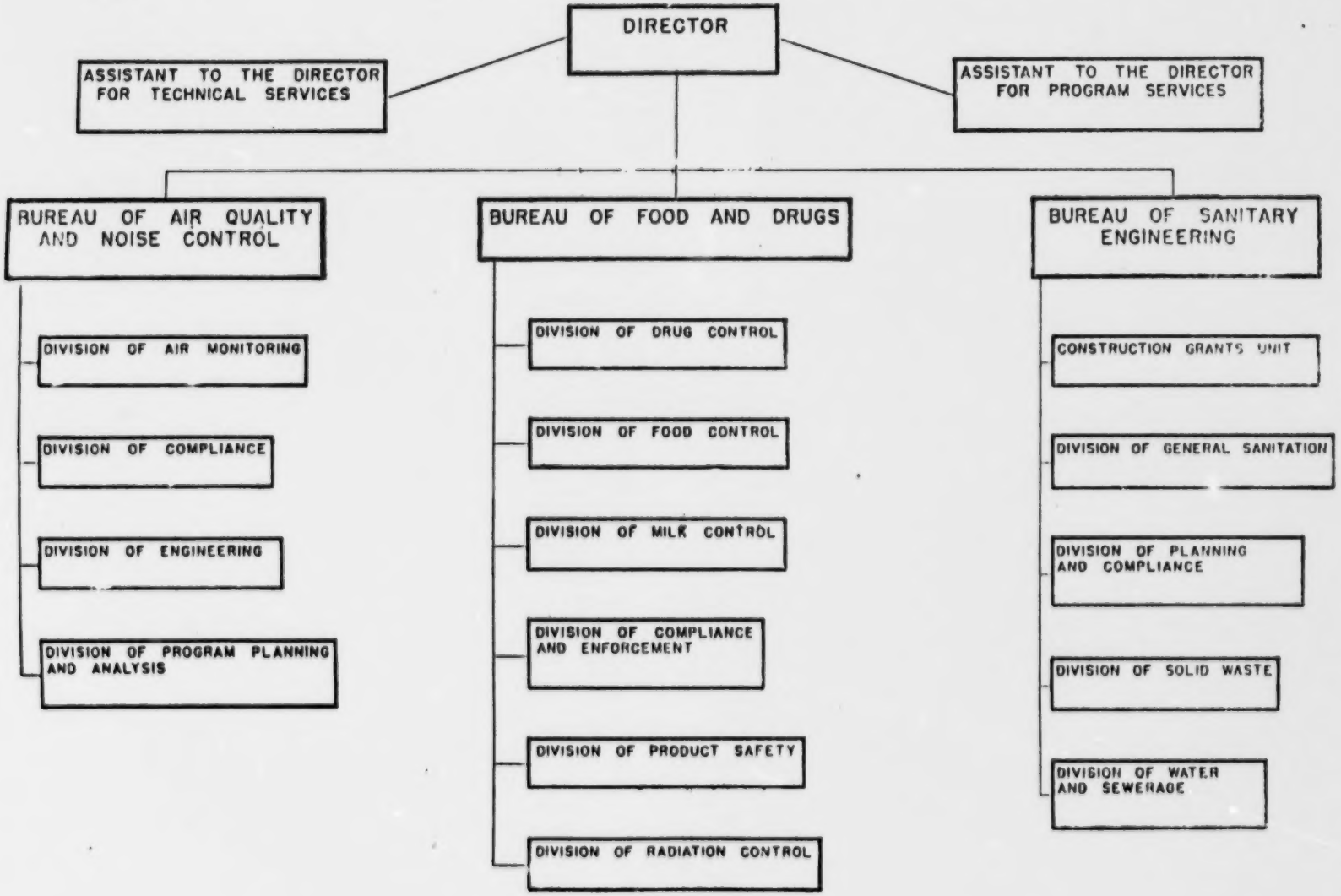
The EHA enforces the state public health laws, standards and permits. The EHA performs review of plans and specifications, facility planning, reviews engineering plans, inspects the construction of wastewater treatment plants and reviews comprehensive county plans for the treatment of sewage and solid wastes, and ensures that these facilities are properly inspected and maintained. Basically, the EHA enforces environmental standards that have public health implications.

The Department of Natural Resources' Water Resources Administration handles the National Pollutant Discharge Elimination System (NPDES) permit program, and prepares Section 303 and River Basin Plans. The Water Resources Management Administration has a total staff of over 127 persons with biologists, engineers, natural resource planners, and geologists predominating. Four programs compose the Water Resource Management Administration: General Director, Enforcement, Permits, and Technical Services. The Water Resources Management Administration is responsible for monitoring and regulating Maryland's 363 water treatment and 352 wastewater treatment plants. In addition, the Administration is actively involved in enforcing the state's regulations created as a result of the Hazardous Substances Act, the Flood Control Program, and the Surface Mining Act.

MARYLAND STATE DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Figure 1

ENVIRONMENTAL HEALTH ADMINISTRATION


DIRECTOR
ASSISTANT TO THE DIRECTOR FOR TECHNICAL SERVICES
ASSISTANT TO THE DIRECTOR FOR PROGRAM SERVICES
BUREAU OF AIR QUALITY AND NOISE CONTROL
DIVISION OF AIR MONITORING
DIVISION OF COMPLIANCE
DIVISION OF ENGINEERING
DIVISION OF PROGRAM PLANNING AND ANALYSIS
BUREAU OF FOOD AND DRUGS
DIVISION OF DRUG CONTROL
DIVISION OF FOOD CONTROL
DIVISION OF MILK CONTROL
DIVISION OF COMPLIANCE AND ENFORCEMENT
DIVISION OF PRODUCT SAFETY
DIVISION OF RADIATION CONTROL
BUREAU OF SANITARY ENGINEERING
CONSTRUCTION GRANTS UNIT
DIVISION OF GENERAL SANITATION
DIVISION OF PLANNING AND COMPLIANCE
DIVISION OF SOLID WASTE
DIVISION OF WATER AND SEWERAGE

Pollution Control and Abatement Programs

I. AIR

A. Introduction

Air pollution control and abatement responsibilities in the State of Maryland are with the Bureau of Air Quality and Noise which is a part of the Department of Health and Mental Hygiene. According to a report released by the EPA Office of Air and Waste Management, Office of Air Quality Planning and Standards, and entitled State Air Pollution Implementation Plan Progress Report, January 1 to June 30, 1976, Maryland has a total of 224 major installations which are annually capable of emitting over one hundred tons of a pollutant each year. With respect to emission limits and/or compliance schedules, 212 of these installations are in compliance with EPA standards and only 12 are still currently in violation. The report further indicated that the State has a total of 169 person-years in actual resources available in Fiscal Year 1976 to further the progress made toward the goals mandated by the Federal Clean Air Act and that 212 person-years are needed for Fiscal Year 1977 in order to perform adequately regulatory tasks in Maryland. Maryland's New Source Review Plan has been approved by EPA as have been certain transportation measures and emission limitations developed by the State program.

Six Air Quality Control Regions include parts of Maryland in their jurisdictions. They are:

National Capital Interstate
Central Maryland Intrastate
Cumberland-Keyser Interstate

Eastern Shore Intrastate
Metropolitan Baltimore Intrastate
Southern Maryland Intrastate

Some of the Air Quality Control Regions also encompass parts of other states besides Maryland. The following information depicts the attainment status for only the Maryland portions of the Air Quality Control Regions and is adapted from the previously mentioned EPA report:

MARYLAND

Attainment Status of National Ambient Air Quality Standards by Air Quality Control Region[1]

AQCR	Pollutant	TSP	SO_2	CO	O_x	NO_2
047.	National Capital Interstate (Md. portion)			AR	AR	
112.	Central Maryland	X			AR	
113.	Cumberland-Keyser Interstate (Md. portion)	AR			AR	
114.	Eastern Shore				AR	
115.	Metropolitan Baltimore	AR		AR	AR	
116.	Southern Maryland				AR	

[1] "X" indicates non-attainment of an applicable NAAQS, but no call for a SIP revision.

"AR" indicates non-attainment of an applicable NAAQS and a call for a SIP revision for attainment and maintenance.

"MR" indicates attainment of an applicable NAAQS, however, a SIP revision for maintenance is necessary.

A blank indicates attainment of an applicable NAAQS and no calls for SIP revisions.

It is evident from the preceding chart that all of the National Ambient Air Quality Standards (NAAQS) for SO_2 have been met in Maryland, whereas all of the Air Quality Control Regions in the State have not attained the standards for control of photochemical oxidants in the state and that the State Implementation Plan for control of O_x has been required by EPA to be revised. Metropolitan Baltimore and the Maryland portion of the National Capital Interstate Air Quality Control Region still have significant air problems in the state. Baltimore has only been able to attain the SO_2 standards while the TSP, CO and NO_2 National Ambient Air Quality Standards have not been attained. The Maryland portion of the National Capital Interstate Air Quality Control Region has been unable to attain standards for both NO_2 and oxidants.

B. Workforce Profile

The Bureau of Air Quality and Noise Control is a relatively large organization with a total of eighty-four employees (not including vacancies) in the Bureau's headquarters office in Baltimore, in a Western Maryland Regional Office and an Eastern Shore Regional Office. The Bureau has personnel located in the Air Quality Laboratory under the Laboratories and Research Administration and additional administrative support capabilities provided by an Office of Legal Services and an Office of Public Education. The Bureau is basically organized into four divisions and a Noise Control Section. The Divisions are the following:

1) Division of Program Planning and Analysis ;
2) Division of Engineering ;
3) Division of Compliance ;
4) Division of Air Monitoring .

Each of the four divisions is headed by a chief and staffed by public health engineers, environmental health assistants, sanitarians and occupational specialists. The following table depicts the total numbers of personnel (not including vacancies) currently engaged in air quality control within the Bureau of Air Quality and Noise Control, excluding Noise Control Section personnel as they will be covered in a separate section of this report.

TABLE I

MARYLAND DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Bureau of Air Quality and Noise Control
Air Programs
Current (1976) Staffing Level

Position	1976
Engineer	28
Technician	13
Sanitarian	13
Other	14
TOTAL	68

Not included in the totals depicted in Table I are one EPA assigned meteorologist and the special attorney position which was not filled until 1977. The engineering positions depicted in Table I are classified by the State Merit System as public health engineers. Most of the professional staff of both the Division of Program Planning and Analysis and the Division of Engineering are public health engineers. Both the Division of Compliance and the Division of Air Monitoring have currently vacant public health engineering positions which are not likely to be filled due to fiscal constraints in the Bureau's operating budget for Fiscal Year 1977.

The "Technician" positions depicted in Table I represent environmental health aides who have had some college or no college and perform such tasks

as changing air samplers and performing field work for the Division of Air Monitoring, or serve as certified smoke readers for the Division of Compliance. For the Division of Planning and Program Analysis, environmental health aides may conduct statistical and data analysis work.

Sanitarians usually have a Bachelor or an Associate of Science Degree to qualify for an entry level position. The director and office assistants or secretaries make up the bulk of the positions depicted in the "Other" category in Table I.

Personnel working in the Air Quality Laboratory do not fall under the direct authority of the Bureau of Air Quality and Noise Control or even under the Environmental Health Administration, but under the Laboratories and Research Administration of the Secretary of the Department of Health and Mental Hygiene. Personnel employed in the Laboratories and Research Administration receive the bulk of their funding support from the various programs within the Department. The current staffing level of the Air Quality Laboratory is as follows:

TABLE II

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Laboratories and Research Administration
Air Quality Laboratory
Current (1976) Staffing Level

Position	1976
Research Scientist	6
Laboratory Aide	5
Other	1
TOTAL	12

Research scientists employed by the Air Quality Laboratory are called laboratory specialists. The laboratory aides serve in technician level capacities.

The Bureau has had monitoring sites located in the City of Baltimore and in Anne Arundel County that were manned but the Bureau has undergone a phasing out of personnel-manned monitoring stations. Maryland no longer has manned monitoring stations in the state at the present time.

Maryland has ten local air programs according to information published by the Air Pollution Control Association for the EPA Office of Air Programs entitled 1974-1975 Directory: Governmental Air Pollution Agencies. State program officials consider that the data included in the APCA Directory of Governmental Air Pollution Agencies to still be valid at the present time. Local programs staffing level is not considered to change much as they usually operate with a minimum staff. The following agencies in Maryland have personnel assigned to local air pollution control regulatory programs:

1) Allegany County Health Department (Cumberland)

2) Anne Arundel County Department of Health, Division of Environmental Health, Air Quality Control Section (Annapolis)

3) Baltimore City Health Department, Division of Air Pollution Control, Bureau of Industrial Hygiene (Baltimore)

4) Baltimore County Department of Health (Towson)

5) Frederick County Health Department, Air Quality Control (Frederick)

6) Harford County Health Department (Bel Air)

7) Howard County Health Department (Ellicott City)

8) Montgomery County Department of Environmental Protection, Division of Resource Protection (Rockville)

9) Prince George's County Health Department (Cheverly)

10) Washington County Health Department (Hagerstown)

The following table depicts approximate total numbers of personnel currently employed in local air pollution control and abatement agencies in Maryland.

TABLE III

STATE OF MARYLAND

Local Pollution Control and Abatement Agencies
Current (1976) Staffing Level (est.)*

Position	1976
Engineer	15
Attorney	2
Meteorologist	0
Research Scientist	2
Technician	17
Trainer/Aide	5
Sanitarian	51
Other	15
TOTAL	105

* Includes both full-time and part-time personnel

The State of Maryland has enacted legislation dealing with hazardous and other toxic substances that are found in the air such as carcinogens. It is not an EPA mandated program but one in which the state took its own initiative by amending Article 43 of the General Air Pollution Control Code. The Maryland legislature also enacted toxic substances legislation during the 1976 regular annual session of the State Legislature. The legislation divided authority between the Department of Health and Mental Hygiene and the Department of Human Resources for the control of such substances. State officials are unsure how such legislation may affect their agency in the future.

State air program officials have estimated that the State of Maryland has over 600 separate sources which emit air pollutants and employ about 500 persons on a full and part-time basis to control air pollution emissions. These persons are usually employed in technician-level positions, according to Bureau administrators. If the state agency, the laboratory, the local programs and the private estimates are all combined, there are an estimated 618 persons employed in the field of air pollution control and abatement in either a regulatory or control capacity.

C. Workforce Projections

Bureau of Air Quality and Noise Control administrators project that the state air pollution control and abatement staffing level will not increase in the next five years. The Bureau is to undergo a minor staff reduction in Fiscal Year 1977 with four professional positions remaining unfilled. If EPA funding remains consistent over the next five years, then there will be no further reduction in staffing level. The budget for Fiscal Year 1977 was cut from the 1976 level by the Maryland Legislature. The turnover rate experienced by the Bureau has recently been high among the professional positions since vacancies for three public health engineers are not expected to be filled.

The Department of Health has proposed legislation requiring motor vehicle inspections but the case is now being argued before the Supreme Court. The State of Maryland is arguing the case against requiring motor vehicle auto emission inspection regulations but EPA is arguing for it. If EPA wins the case it will force the state to create a motor vehicle inspection and maintenance program. If any positions are likely to be

added to the Bureau's staff because of additional responsibilities for conducting an inspection and maintenance program, then the Bureau may recruit an additional ten technician-level personnel in the next five years.

An additional three or four engineers or technicians may be recruited for the Division of Air Monitoring activities in the next five years if funding is available. Still, no growth is anticipated by state officials for either state or local air pollution control and abatement programs in the next five years.

D. Training and Certification

The Bureau of Air Quality and Noise Control offers little in-house training for staff other than a general familiarization with Department rules and regulations and state and federal laws. Most of the training activity offered by the Bureau for its employees is on-the-job. The Bureau does place a heavy reliance on EPA courses offered by the Air Pollution Training Institute. The State of Maryland sent a total of nine persons to EPA Air Pollution Training Institute courses during Fiscal Year 1976, according to end of the year data published by the Institute. The Bureau is, nonetheless, hampered by tight travel budgets and low training authorizations. Program officials only expect to send four to five students to the Institute for additional training during Fiscal Year 1977. At the local level, Prince George's County sent three staff members to the Institute during Fiscal Year 1976; the Allegany County Health Department sent three persons; and, Baltimore County sent two staff members to the Air Pollution Training Institute courses during Fiscal Year 1976. In sum, the public

sector sent a total of 39 persons to Air Pollution Training Institute courses during Fiscal Year 1976.

Most of the Bureau's professional staff personnel already have their Master's degrees as the state has liberal education benefits. One person received an EPA educational fellowship for long-term training during Fiscal Year 1976 but no staff member is expected to participate in receiving long-term training during Fiscal Year 1977. Approximately seven or eight staff members from the Bureau have received long-term training in the past two years. They usually receive their training from the University of Maryland or the John Hopkins School of Public Health in Baltimore.

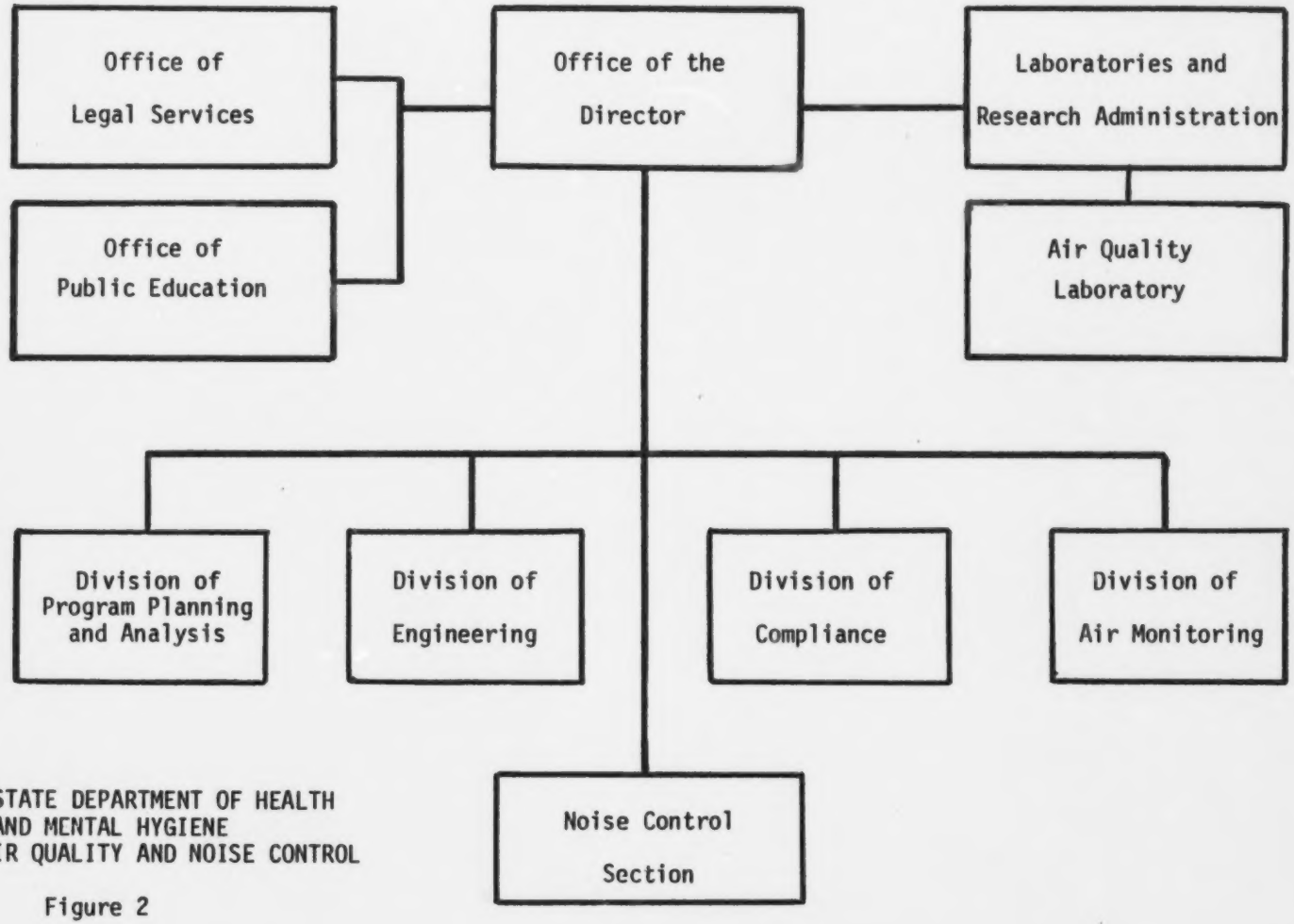
The Bureau also sponsors a visible emission certification program for the public in Maryland. Two certification sessions are held annually and between 55 to 65 persons participate during each biannual session. The state requires that "smoke readers" be recertified every six months to retain active certified status. A short course is held at each of the sessions to provide instruction describing techniques for reading smoke for those who had not been previously certified. The Bureau administers the examinations at Mount Wilson State Hospital west of Baltimore. The basic short course is designed to last only one day during the session.

E. Career Potential

Within the next five years, if the State of Maryland adopts a program of requiring motor vehicle emission inspections, there may be a demand for mechanics or other technician-level personnel trained in this area. Legislation for such regulations has been proposed to the Maryland Legislature every year since 1972 and state officials expect that the proposal will be renewed in January, 1978.

F. Conclusion

There is unlikely to be any staff growth in either the Bureau of Air Quality and Noise Control or any of the ten local air programs in Maryland in the next five years. The principal reason for skepticism among state officials concerning possible growth is that EPA has placed more and more demands upon the Bureau without providing increased funds to perform the tasks required. Such tasks have included such things as developing New Source Performance Standards and ensuring that industries being regulated do not cause a significant deterioration in the present standards. The Bureau underwent a cut in its budget for Fiscal Year 1977 from the 1976 level, and such cuts contribute to program administrator's skepticism regarding whether or not additional funding will be forthcoming from either federal or state sources which would allow staff growth.



MARYLAND STATE DEPARTMENT OF HEALTH
AND MENTAL HYGIENE
BUREAU OF AIR QUALITY AND NOISE CONTROL

Figure 2

II. NOISE

A. Introduction

Noise pollution control and abatement activities in the State of Maryland are the principal responsibility of the Noise Control Section within the Bureau of Air Quality and Noise Control. There are also active noise control and abatement activities conducted by the Maryland Department of Natural Resources, the State police, and the Department of Transportation's State Aviation Administration. There are also some sporadic noise monitoring functions carried out by various counties in Maryland, e.g., Montgomery County. The Bureau is administratively located under the Environmental Health Administration in the State Department of Health. The Noise Control Section was created in 1973, when the State Legislature enacted statewide noise restrictions regulating motor vehicle mufflers and regulations concerning property line sound level limitations. Local noise ordinances may be stricter than the statewide regulations, but the state required that motor vehicle and motorcycle sound level limits must also be adopted on a statewide basis.

According to an article recently published by Clifford R. Bragdon in Sound and Vibration (December, 1976) entitled "Municipal Noise Ordinances-1976," Maryland has three municipalities which have adopted some form of municipal noise ordinance. Baltimore, Cumberland and Rockville have all adopted nuisance noise ordinances, but no acoustical criteria is included. Baltimore has adopted zoning noise ordinances including acoustical criteria and recreational/vehicle ordinances with no acoustical criteria.

B. Workforce Profile

The Noise Control Section presently (1976) consists of a public health engineer who was transferred from air quality duties in the Bureau, a sanitarian and a clerical position. The Noise Control Section investigates complaints, performs data analyses, formulates programs, conducts noise surveys and provides enforcement of statewide noise restrictions. The Section's staff also provide educational assistance to communities in developing model noise ordinances and speak before interested groups and organizations.

C. Workforce Projections

Bureau of Air Quality and Noise Control administrative officials project no growth in staffing level in the Noise Control Section over the next five years due to budgetary restrictions. Section officials project that an additional sanitarian and an environmental health aide position are needed to conduct a federally funded noise labeling program to warn users that the equipment so labeled may be potentially hazardous due to noise emission levels. The two positions are also needed to provide an educational support capability to communities by assisting them with developing community noise regulations. Although the Section currently lectures concerned groups regarding noise pollution problems, the proposed educational program would include the development of media formats to enlarge the audience. By 1981, if funding is available, the Noise Control Section's administrators would like to recruit six additional technicians for noise monitoring activities.

It is anticipated by Bureau officials that the sanitarian currently assigned to the Noise Section may be transferred back to the Bureau's air

quality program during 1977. Program officials state that the Noise Control Section has never had more than one position specifically assigned to noise control and abatement duties in the Section. Others have been temporarily assigned from other programs.

D. Training and Certification

Training available to staff of the Noise Control Section has been limited in the past two years. Two persons from the Section have attended the course offered at Cook College at Rutgers University in New Jersey entitled Basics of Noise Control. Staff members plan to attend the College's courses as they become available in the future and to send two recruits there.

E. Career Potential

New careers in the noise pollution abatement and control field in the next five years are dependent on future directions federal agencies take in the field. It is unlikely that the Bureau of Air Quality and Noise Control will receive budgetary approval from the Maryland Legislature for additional personnel for noise pollution control activities without additional federal support. Noise pollution and abatement careers in the private sector are also mostly dependent on what is required for compliance by EPA and OSHA.

F. Conclusion

Maryland's state noise pollution control and abatement program has only been in existence for four years but new program initiatives are

only now beginning to develop in the field, primarily because of renewed federal EPA interest in developing the program. Growth in the state program is unlikely to be dramatic over the next five years because of budgetary restrictions in the Bureau's budget.

III. PESTICIDES

A. Introduction

The Division of Plant Industries, under the Maryland Department of Agriculture, is responsible for enforcement of the Maryland Pesticide Applicators Law of 1975, and the Maryland Pesticide Registration and Labeling Law. The Maryland Pesticide Applicators Law provides for the licensing of pesticide businesses, certification of commercial applicators, requires permits for all persons to use restricted use pesticides, and requires public agency applicators to obtain permits. The Law also requires that it be unlawful to apply pesticides for hire or to act as a pest control consultant unless licensed by the Department of Agriculture. Private applicators are also required to become certified and to renew their certification periodically.

The Department of Agriculture is the lead agency in the state for the administration of the pesticide certification program. Coordination of the certification program with the State Cooperative Extension Service is necessary as the Extension Service is active in the training and certification of pesticide applicators. The Department also receives advice from the Maryland Pesticide Advisory Board and the Maryland Agricultural Commission.

B. Workforce Profile

The Secretary of the Department of Agriculture has designated a supervisor to manage the state's pesticide program and to enforce the Pesticide Applicators Law. The pesticide staff is composed of five persons under the Division of Plant Industries. These include two entomologists of whom one

is a plant pathologist, an entomologist-consultant, a supervisor and one field inspector. Three clerical personnel provide support for the pesticide staff. At the Pesticide Laboratory, there are two chemists and a laboratory assistant assigned to analyzing pesticide residues and formulations.

Two extension training specialists of the University of Maryland's State Cooperative Extension Service are currently involved in the training and certification of applicators as required under FIFRA. They are assisted by nineteen county extension agents (one in each of Maryland's nineteen counties) in conducting the training.

State officials estimate that approximately 1,400 commercial applicators are required to obtain training and certification in Maryland to meet the requirements of federal and state legislation. According to the most recent information available, there are 1,090 certified commercial applicators who have undergone the required training as of March 31, 1977. State officials estimate that each commercial applicator obtains certification in 3.25 categories. The 1,090 figure includes those who have obtained certification in more than one category as follows:

Maryland Pesticide Applicator Categories*

A) Commercial Applicator
    1) Agricultural Pest Control
        a) Plant
        b) Animal
        c) Fumigation
    2) Forest Pest Control
    3) Ornamental and/or Turf Pest Control

4) Seed Treatment

5) Aquatic Pest Control

6) Right-of-Way Pest Control

7) Industrial, Institutional, Structural and Health Related Pest Controls

Subcategories:

a) General Pest Control

b) Termite Control

c) Bird Control

d) Fumigation

e) Rodent Control

f) Industrial Weed Control

8) Public Health Pest Control

9) Regulatory Pest Control

10) Demonstration and Research Pest Control

B) Private Applicator - This category includes, but is not limited to, the following agricultural commodity groups: Field and Forage Crops, Fruit Crops, Livestock and Poultry, Nursery, Tobacco, Turf, and Vegetables.

* Specific numbers of applicators certified in each category were not available.

The total estimated pest control picture is depicted in the following table, in which numbers reflect approximations of the workforce engaged in pesticides application or regulatory control on either a full- or part-time basis.

TABLE IV

MARYLAND PESTICIDE CONTROL

Current (1976) Staffing Levels for
Public and Private Sectors (est.)

Public Sector	1976
Division of Plant Industries	8
State Laboratory	3
State Extension	21
Public Agency Applicator	200-500
TOTAL	232-532
Private Sector	
Farmers	12,000
Owners/Operators/Applicators	2,100
TOTAL	14,100

According to the "Regulations Governing the Control of Pest Control Operators in the State of Maryland", persons in Maryland who "engage in the business of pest control" either as individuals or business organizations, must obtain a Pest Control License from the Department of Agriculture. Persons who desire to apply for a Pest Control License are required to show that they can meet certain financial security provisions and reporting standards, and that they have qualified personnel in their employ to apply pesticides. Those personnel must be certified first by the Department before they can be employed by the licensees as Certified Pest Control Operators. State officials estimate that there are about 500 Pest Control Licenses as Sales and Service Personnel. State officials stated that there are three pest control consultants offering or supplying technical advice or supervision in Maryland.

Maryland has approximately 16,300 farms according to 1974 census of agriculture preliminary reports. About 10,500 of these farms, or 64 percent, are small farms with gross annual sales of $20,000 or less. State officials estimate that Maryland has about 17,000 farmers but only 12,000 will require certification as private applicators. These officials stated that 1544 private applicators have already undergone the training and certification required under FIFRA as of March 31, 1977.

C. Workforce Projections

State officials estimate that two more field inspectors will be needed in the next three years (1977-80) to enforce state and federal pesticide control legislation. Two additional professional employees (entomologists, chemists or plant pathologists) are also projected to be hired for the program in the next five years. Although no estimated projections of numbers of commercial or private applicators were obtainable from state officials, it is anticipated that the numbers of private applicators in Maryland will decline somewhat in the next five years. A corresponding increase in the number of custom (commercial) applicators doing business in the state is anticipated and there is likely to be a small increase in the numbers of public agency applicators certified by the state. About thirty-five governmental agencies have certified public agency applicators in their employ in Maryland.

D. Training and Certification

To become certified as a commercial applicator in Maryland, applicants are required to pass both written and practical examinations. The

examinations are designed to cover both general and specific information in each category in which the applicant seeks certification. The Department of Agriculture and the State Cooperative Extension Service are responsible for the preparation of educational materials. Pesticide applicators receive training conducted annually by both of these agencies. The State Plan requires that commercial applicators attend annually sponsored Agricultural Pesticide Conferences in lieu of re-examination. Special training sessions supplement these annual conferences. As previously mentioned, each commercial applicator has been averaging certification in 3.25 categories. This has been a drop from a previous average of certification of 6.5 categories, primarily because the Maryland Pesticide Applicators law requires that "each application for a certificate by a pest control consultant, a pest control applicator and custom applicator shall be accompanied by a $50 certificate fee plus $25 for each category in excess of one." Fees for private applicators are not to exceed $7.00.

The training being conducted in Maryland of both commercial and private applicators to meet the October 21, 1977, FIFRA deadline lasts only one to two days and each session is attended by approximately thirty private applicators. Commercial applicators take a written examination at the University of Maryland and about one hundred applicators per month attend these sessions. Training for commercial applicators is conducted by the Department of Agriculture's officials in various locations around the state, whereas all training of private applicators is conducted by county extension agents in each of Maryland's nineteen counties.

The Department of Agriculture has developed training manuals for the following categories: Agriculture (Plant and Animal); Forest; Ornamental

and/or Turf; Aquatic; Right-of-Way; Industrial; Institutional; Structural and Health Related and the following subcategories (Fumigation, Bird Control, Industrial Weed Control). No Manual has been developed for Demonstrational Research Pest Control Category but an examination has been developed instead.

Private applicators, or agricultural commodity producers as termed in the State Plan, are offered two options for obtaining certification. The first option (Option A) requires that an applicator take a written examination. The second option (Option B) is a training session that is for those who decide not to take a written examination and for those who fail the written examination. At the end of the training session, the instructor discusses with the private applicators a series of questions. When the training session is completed, both the applicant and the Extension Agent sign a certificate which is sent to the Supervisor of the Pesticide Applicators Law. The Supervisor, in return, sends a certificate and an I.D. card to the applicant. State officials estimate that some 1,200 I.D. cards have already been sent to private applicators as of April, 1977. After five months of training and certification conducted in Maryland, one-fourth of the farmers applying for private applicators certification have opted for taking the examination and three-fourths have participated in the training sessions, according to state officials.

The principal contact officials with the private applicators are the County Extension Agents who distribute training materials for various agricultural commodity groups through the Extension Services. EPA has reviewed the existing examination system that was in effect for the licensing of commercial applicators and was satisfied that the system was in

compliance with 40 CFR 171. The Maryland State Plan allows that all commercial applicators who had passed written examinations under the previous program to be certified without re-examination. All private applicators are required to subsequently attend approved pesticide conferences or meetings in three of the five years prior to the renewal of their certification.

E. Career Potential

It is expected that career potential in the pesticides field in the next five years will be primarily in the private sector. Minimal growth is projected for the Pesticide regulatory section within the Division of Plant Industries. The number of farmers in Maryland has been declining over the past few years and there is expected to be a gradual decline in the number of private applicators in the state. There will most likely be a small increase each year in the number of custom pesticide applicator businesses.

The Department of Agriculture has been working on integrated pest management programs on certain crops, but in the opinion of the Secretary of Agriculture, integrated pest management programs in Maryland have not yet been developed to the operational level and will not be so developed for several years. It is not anticipated that such programs will result in less usage of pesticides, but are for more effective use through more appropriate timing of pesticide applications as needed. The result could be both a reduction in pesticide usage and in increased applications if conditions show that such applications would be appropriate. Career potential developing through the implementation of integrated pest

management programs in Maryland are not anticipated to result in a greater workforce developing in the next five year period.

F. Conclusion

While it is expected that employment opportunities in the pesticide regulatory area in Maryland will be slow in emerging, it can be expected that some growth will occur in the numbers of commercial applicators. The requirement for mandatory attendance of commercial applicators. in lieu of re-examinations, at annually sponsored Agricultural Pesticide Conferences, and also of private applicators at approved pesticide conferences or meetings in three of the five years prior to renewal of their certification, will ensure a cadre of well-informed pesticide users in the State of Maryland.

IV. POTABLE WATER

A. Introduction

Maryland's Environmental Service Act (Maryland Code NR 3-101) provides for the regulation of dependable and efficient water supplies in the state. The Act authorizes the Department of Natural Resources and the Environmental Health Administration to:

1) issue regulations pursuant to the Act;
2) operate and construct facilities within the state;
3) make plans and studies regarding water supply and purification;
4) establish various service regions and to prepare five year plans;
5) have general responsibility for carrying out five year plans.

Generally, the Department of Natural Resources has permitting responsibilities for water supplies. The staff conducts river basin planning for the development of comprehensive water and sewage plans. The Environmental Health Administration, Department of Health and Mental Hygiene, has all other jurisdictions over the water supply program, e.g., laboratory analysis, enforcement and the performance of sanitary surveys.

Maryland has expressed intent to the U.S. Environmental Protection Agency for the assumption of primary enforcement responsibilities of the Federal Safe Drinking Water Act. The Maryland Safe Drinking Water

Act was enacted in 1975, to prepare the state for the assumption of primacy. Maryland officials stated that the Maryland health laws dealing with public water supplies are more stringent than federal laws.

Maryland has a total of 360 water supply systems in the state; most are municipal. There are to be an additional 440 systems so classified under the federal act. Therefore, it is estimated that there is a total of 800 public water supply systems in Maryland according to the EPA definition. There are also about 60 to 70 water resources in Maryland.

B. Workforce Profile

Part of the responsibilities for the potable water program are assigned to the Environmental Health Administration under the Maryland Department of Health and Mental Hygiene. Water supply regulatory personnel work within the Division of Waters and Sewage's Water Section. The Division is composed of Water, Sewer, Operations and Technical Review sections. The water section is currently staffed with nine persons whose positions are depicted in the following table:

TABLE V

STATE OF MARYLAND

Department of Health and Mental Hygiene
Division of Water and Sewage
Current (1976) Staffing Level

Position	1976
Engineer[1]	2
Technician[2]	3
Sanitarian	1
Other	3
TOTAL	9

[1]Public Health Engineer
[2]Environmental Health Aide

With the addition of federal funding, 13 positions are expected to be added to the nine state-funded positions. The City of Baltimore has three sanitarians who assist the state in collecting shellfish samples for analyses as does Baltimore County.

The Department of Natural Resources, Water Resources Administration, performs monitoring of water supplies related to waste water pollution control and abatement functions. The Water Resources Administration has a total of five full-time persons devoted to water supply activities. These persons work administratively within the Permit Program's Water Supply Section.

The Department of Natural Resource's Environmental Manpower and Education unit completed "Manpower Needs Survey" in October, 1976. It is an updated workforce summary of municipal water treatment

facilities. Requests for data were mailed to 363 water plants, of which 135 (37 percent) responded. At present, 1976, there is a total of 670 full-time personnel working in water treatment facilities. In 1973, 25 percent, or 504 fewer persons were working in water treatment facilities. It is evident to the Department's officials that the increase in the workforce over the last three years indicates a need for upgrade and skill improvement training if facilities are to be effectively, efficiently and safely operated. The survey showed that the workforce has increased by 25 percent, and, because of construction and increased staffing demands, the water treatment plant workforce is expected to continue to increase. The increase in workforce consequently created a greater demand for entry level as well as skill improvement training.

According to data accumulated by the Maryland Board of Certification, there is a total of 1,800 operators in the state, including those employed in water treatment plants, wastewater treatment plants and industrial treatment plants. The plants are classified A through D with A being the most advanced facility. The criteria for classification is size and complexity. The following is an approximation of the total number of operators certified in Maryland. Specific breakdowns on numbers of operators certified as water treatment plant operators by grades were not available.

TABLE VI

STATE OF MARYLAND

Certified Treatment Operators (est.)

Grade	Operators
A	100
B	200
C	750
D	750
TOTAL	1,800

Of the 1,800 operators, it is estimated that there is a total of 700 water treatment plant operators employed in Maryland. In both the public and private sectors, there may be more than 50 additional uncertified workers including administrators and maintenance personnel.

C. Workforce Projections

Workforce projections are based upon the best professional judgements of administrative personnel of both the Department of Natural Resources and the Department of Health and Mental Hygiene. The Environmental Health Administrations potable water workforce is expected to increase dramatically in the next few years as a consequence of funds provided from EPA for implementation of the Federal Safe Drinking Water Act. To assist the state in preparing for the assumption of primary enforcement responsibilities, the federal government has provided the Environmental Health Administration with funding to hire an additional thirteen persons to complement the three existing professional positions, which are supported by state funding. Two public health engineers and a sanitarian are supported by state monies and federal funds are to support three

environmental health aides and three clerical positions. It is anticipated by Environmental Health Administration officials that all of the federally supported positions will be recruited and on board by the end of Fiscal Year 1977. In addition, state officials estimate that one or two public health engineering positions or sanitarians will be recruited between 1977 and 1982. The positions that are expected to be recruited are depicted in the following table.

TABLE VII

STATE OF MARYLAND

Environmental Health Administration
Potable Water Program Operations
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	2	5	5	6	6	6	5%	34%
Technician	3	3	3	3	3	3	n/a	0
Sanitarian	1	4	4	5	5	5	n/a	n/a*
Other	3	3	3	3	3	3	n/a	0
TOTAL	9	15	15	17	17	17	5%	13%

* Not reasonably depicted

Environmental Health Administration officials estimate that they experience between four to five percent annual rate of turnover among their positions. The greatest turnover is among the engineering positions, because engineers receive higher salaries from both the federal government and private enterprise. Difficulty is experienced, then, in finding professionals who qualify. There is relatively little turnover among the sanitarian positions. The Administration advertises in newspapers and hires through the merit system.

Sources in the field project that the assumption of primary enforcement responsibilities over the Federal Safe Drinking Water Act and enforcement of the new Maryland Safe Drinking Water Act, will necessitate an increase in the number of certified treatment plant operators over the next five years. Local health departments, e.g., Baltimore City and Baltimore County will also receive additional funding to perform collection of samples tasks. Board of Certification officials project that the number of operators requiring certification will increase from 1,800 to 3,000 by 1982. The principal reason for such dramatic growth in the water treatment portion of this total is that many operators of small water supply systems will have to become certified as a consequence of the new state and federal legislation. Also, many water treatment plants are expected to be updated, revised, constructed and refurbished with the availability of federal funds. Specific projections of grades of operators expected to be certified within the next five years is unobtainable at the present.

D. Training and Certification

The Environmental Health Administration and the Department of Natural Resources employ training specialists to manage training programs for both in-house staff and for water treatment plant operators. Environmental Health Administration employees receive on-the-job training when they are periodically rotated among the divisions. Staff also upgrade their abilities whenever possible by attending short-term training courses and technical conferences.

The Administration's Training and Education Unit conducts training for both water and wastewater treatment plant operators. Operators in Maryland do not receive separate training and certification. The Department also has a formal on-the-job training program for Department personnel and some training is also conducted for local health department personnel. Some in-house personnel conduct training but most of the training for operators and others is contracted to be conducted at community colleges and through private colleges. Maryland requires that operators must undergo training in order to receive certification. Two hundred to two hundred and twenty wastewater and water treatment plant operators receive operator training each year through the Environmental Health Administration sponsored programs. Most of the training currently sponsored by the state is funded by state sources rather than by the federal government.

One of the training specialists of the Administration's Training and Education Unit recently attended an EPA conference at Regional Office headquarters in Philadelphia to discuss how to manage a state training program for implementation of the Federal Safe Drinking Water Act. State officials estimated that at least one person year is required to conduct training oriented toward implementing the Act and twenty percent of this person(s) time would have to spent educating the general public. It is necessary to educate the Administration's Water Section staff under the Bureau of Sanitary Engineering first to enable these and other professionals to learn how to recognize cross-connections, for example. A problem which may eventually limit the effectiveness of this program is that administration officials state that in the Federal Act, training is never specifically

referred to or required in the Act's provisions. It needs to be decided by EPA or the State of Maryland just what training needs to be provided for operators to carry out the Safe Drinking Water Act. For example determination must be made as to training needs of newly recruited operators who will be employed at new or modified plants.

Maryland currently uses the "Texas Water Manual" for its water treatment plant operator training. The state offers training for water treatment plant operators on how to test water samples for chlorine residuals and now employers of these operators will need to be trained, but there is no money in the Federal Act to provide this training, according to state officials. State training officials have also attempted to acquire training funds from the state, but Department officials are not committed to taking action to fill this need at present. Further information regarding operator and staff training will be addressed in the "Waste Water" Section of this report.

E. Career Potential

It is expected by Environmental Health Administration officials that the advent of the new Federal Safe Drinking Water Act will upgrade the water supply program to comparable status with the wastewater pollution control and abatement program. This new status for the program will necessitate hiring additional engineers, sanitarians and technicians within the next five years to implement primary enforcement responsibilities for the new Federal Act.

There is also a corresponding need for additional water treatment plant operators as many smaller water supplies will be covered in the enforcement program as included in the EPA definition of what constitutes a

public water supply. Many of the present water treatment plant operators will retire within the next five years and new operators will be needed to replace these and to staff new treatment facilities. It is expected that the number of water treatment plant operators who are certified will more than double by 1982.

E. Conclusion

The Department of Public Health and Mental Hygiene's Environmental Health Administration is ready to assume primacy over the new Federal Safe Drinking Water Act. Personnel are being recruited for that effort. Additional public health engineers, sanitarians and environmental health aides will be recruited for the Bureau of Sanitary Engineering's Water Section. These new employees will require training to enable them to carry out their new responsibilities.

The state's 800 water treatment plant operators will experience a large turnover rate, as many will be retiring within the next five years period. Many additional operators will be needed to replace these and to fill new positions created as a result of plant modification and construction. Maryland's Public Health Department needs at least one additional training specialist to be designated specifically to provide training programs for state and local health department professionals and for operators. Technician level operator training is surely needed prior to the time these operators retire and new ones are needed to replace them and to staff new treatment plants. However, a problem exists in being able to provide training through the state because the State Board of Community Colleges does not consider it necessary to develop new water

treatment training programs, since they feel existing programs are adequate. Employers of water treatment plant operators also need to be educated to recognize the need for better trained personnel and possibly to create incentives for better performance through better salaries. Training officials need to demonstrate that there is a market for operators with associate degrees prior to development of a training program. Under present conditions, an employer is likely to hire a less skilled person who will work for less if he is not required to have better trained personnel.

V. RADIATION

A. Introduction

Regulatory responsibilities for the control of radiation are under the purview of the Division of Radiation Control under the Department of Health and Mental Hygiene. The Division is a part of the Bureau of Food and Drug which is located under the Department's Environmental Health Administration. The Division of Radiation control is primarily involved in the licensing and regulation of X-ray machines, but legislation authorizing regulation of non-ionizing sources of radiation was passed by the State Legislature in July, 1976, and delegated to the Division.

Maryland is an Agreement State with the Nuclear Regulatory Commission (NRC) for the control of radioactive materials. The state authorized a program to regulate sources of radiation such as X-ray machines by passing legislation in 1960, under Article 43 and amended by Chapter 88.

Maryland has a regulatory dental/medical and industrial X-ray program for the regulation of approximately 2,700 dental X-ray machines in operation in the state. State officials estimated that there are 121 industrial licenses issued in Maryland and 39 licensees.

Maryland presently has two nuclear power plants in operation. They are both located at Lasby. Both are pressurized water reactors with a total capacity of 845,000 kilowatts. They are operated and maintained by Baltimore Gas and Electric Company. The first unit came into operation in 1975, and the second in 1977, but the second reactor may not yet be under full power. Two more nuclear reactors are planned to be operational in 1985 and 1987 at Douglas Point. They will have a total generating capacity of

1,178,000 kilowatts. Both are boiling water reactors and are to be built by Potomac Electric Power Company. Both of these units are currently under the review process for authorization of construction permits. No nuclear waste materials are stored in Maryland, as all wastes are transported to the storage facility in Barnwell, South Carolina.

B. Workforce Profile

The Division of Radiation Control is composed of two sections: X-ray and Licensing and Inspection. Environmental radiation surveillance activities fall under the responsibilities of the Licensing and Inspection Section. The Division is composed of a chief, three public health radiation specialists, five health physicists, one environmental health aide and two secretaries. Most of the Division's funding comes from state services but some funding is received from the U.S. Department of Health, Education and Welfare and the Nuclear Regulatory Commission. Two persons devote portions of their time to environmental radiation surveillance program activities. One man works full-time collecting samples under NRC contract below Pennsylvania's Peach Bottom Plant in Maryland, and at the two Baltimore Gas and Electric Company Calvert Cliff Nuclear Power Plants; one environmental aide spends one-third of his time on surveillance activities.

The present staff of the Division of Radiation Control is depicted in the following table.

TABLE VIII

MARYLAND DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Environmental Health Administration
Bureau of Food and Drug
Division of Radiation Control
Current (1976) Staffing Level (est.)

Position	1976
Health Physicist	5
Scientist	3
Technician	1
Other	3
TOTAL	12

The three positions depicted in the "Scientist" category are public health radiation specialists. The one "Technician" position is an environmental health aide and the chief is included in the "Other" category along with the two office secretaries.

Local county health departments are not directly involved in radiation control activities although the Baltimore City Health Department has performed some X-ray inspections in the past. Under Radiation Chemistry in the Laboratory's administration, also a part of the Department of Health and Mental Hygiene, there are two chemists and one laboratory technician employed in radiation control work. Under the Power Plant Siting Program in the Department of Natural Resources, one nuclear specialist works with geologists in approving power plant sites for facilities which include nuclear units.

Baltimore Gas and Electric Company may employ approximately thirty to thirty-five persons (including Radiation Safety officers) for radiation control work at its two nuclear power plant units. These personnel also

perform on-site monitoring of point discharges and review technical specifications of the facility's operations.

Program officials employed at the Division of Radiation Control estimate that between 6 to 10 persons are employed as radiation safety officers at the licensed facility users of nuclear materials in the state. It is estimated that between thirty-five to fifty persons are involved in the field of radiation control other than physicians or dentists in Maryland. Sources in the field estimated that there are about three licensed radiation users for each of 250 facilities in Maryland (for a total of 750 users) including radiation safety officers.

C. Workforce Projections

Workforce projections for Division of Radiation Control activities are based on the professional judgments of the Division's administrative officials. The inspection and regulation program of sources of non-ionizing radiation has been delayed for one year. In July, 1977, the Division plans to recruit one public health radiation specialist to become a new section head of this new program. Between July, 1977, and July, 1978, the Division intends to recruit another health physicist to work in the new section. Between 1978 and 1981, the Division is likely to hire one more health physicist. Most of the growth in the private sector will come when the two previously mentioned Douglas Point Nuclear Generating Stations become operational in 1985 and 1987. Projections for staffing increases in the Division of Radiation Control are depicted in the following table.

TABLE IX

MARYLAND DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Division of Radiation Control
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Physicist	5	5	6	6	7	7	n/a	7%
Scientist	3	4	4	4	4	4	6%	7%
Technician	1	1	1	1	1	1	n/a	0
Other	3	3	3	3	3	3	n/a	0
TOTAL	12	13	14	14	15	15	6%	5%

D. Training and Certification

Training received by the Division's staff professionals is primarily on-the-job and all outside training usually consists of what is provided by the Nuclear Regulatory Commission or the Bureau of Radiological Health without charge. Personnel are sent to NRC courses whenever possible and program officials estimate that two persons are sent to NRC courses each year.

Division officials would like to see more courses available in the field of non-ionizing radiation source control and in other areas of radiation control being developed, as well as X-ray control. These officials consider it unfortunate that the Bureau of Radiological Health under the U.S. Food and Drug Administration has reduced its training commitment. The only radiation control training offered by universities or other institutions of higher learning in Maryland are offered by the John Hopkins School of Public Health and at the University of Maryland.

E. Career Potential

As the Division of Radiation Control is now in the process of implementing a program to control sources of non-ionizing radiation, career potential in the field of radiation control is likely to develop slowly in this area. No new careers were forecast as a result of activities in the field of control of non-ionizing radiation control, but more health physicists and public health radiation specialists will likely be hired for the program.

Career potential is likely to remain low in the private sector until the two new nuclear power reactor units at Douglas Point become operational.

F. Conclusion

Maryland devotes the following person years to its radiation control program areas.

Basic Planning and Administration	.30
X-ray Survey and Control	3.10
Environmental Surveillance	3.40
Radioactive Materials	5.00
Electronic Products	.05
Other	.15
TOTAL	12.00

Maryland is an Agreement State with NRC and the Division of Radiation Control has a contract with NRC to perform environmental surveillance at three different points in the state. The Division is just now implementing a program for the regulation of sources of non-ionizing radiation which may offer some potential for employing health physicists and monitoring/surveillance technicians. Still, the development of career fields will depend, for the most part, on the extent to which nuclear power potential is developed. In any case, the field is not likely to have a significant future until after 1985.

VI. SOLID WASTE

A. Introduction

The State of Maryland's sanitary landfills are primarily owned and operated by county health departments. The state has a total of 84 sanitary landfills; 71 (84 percent) are publically owned/operated and 13 (16 percent) are privately owned/operated.

The Maryland State Department of Health and Mental Hygiene is charged under state law with the responsibility for the review, approval and monitoring of proposed refuse disposal systems. Solid waste disposal in Maryland is regulated by Article 43, Sections 394, 394A and 394B of the Annotated Code of Maryland (1966). Section 394 requires that a "refuse disposal system for public use" must have a permit issued by the State Health Department for operations. The Department consults with other Maryland agencies such as the Department of Water Resources, the Maryland Geological Survey, the Soil Conservation Service, the Maryland Environmental Service, the Bureau of Mines and other interested authorities during its review process. The state requires that plans and specifications prepared by a registered professional engineer, delineating the construction and design of the facility, must be submitted to the Department. After a permit is issued, a surveillance program by the Division of Solid Waste Control and county health departments assures that the operation conforms to the approved plans and does not contribute to environmental pollution.

Prior to enactment of the Maryland Solid Waste Act of 1966, the solid waste management program consisted of one person. The Act

established the Division of Solid Waste under the Department of Health and Mental Hygiene. The Division is now a part of the Bureau of Sanitary Engineering under the Environmental Health Administration. The Division issues permits for the operations of refuse disposal systems and permits for the handling or transport of sewage sludge. The Division also now has hazardous waste regulatory responsibilities.

The state's solid waste management program has made considerable progress in reducing the number of open dumps from 140, when the program started, down to eight. The state has 56 permitted landfills, one municipal incinerator and a Pyrolysis Resource Recovery Solid Waste Management System in Baltimore.

Maryland Environmental Services (MES) provides both loans and grants for resource recovery facilities in the state. Four million dollars of the $16 million Gas Pyrolysis demonstration project was provided by MES and the remainder by EPA. In a joint venture with Baltimore County, MES is funding the Baltimore County Solid Waste Disposal System and Reclamation Project. Montgomery County approved a ten-year solid waste management plan calling for a 1,200 ton per day county owned and operated resource recovery system, producing magnetic metals and shredded waste to be used as a supplement to coal in Potomac Electric Power Company (PEPCO) at the Dickerson, Maryland plant.

The new Federal Resource Conservation and Recovery Act is expected to increase the staffing level of the Division of Solid Waste Control from the present level of 18 persons to 23 in the next three years. The Division plans to implement a system for the management of hazardous

wastes. There is expected to be some upgrading of existing landfill operations to hazardous waste facilities. The Division will be involved in issuing permits to industrial plants which generate hazardous waste materials allowing them to regulate their own operations for disposal, as long as they comply with both state and federal regulations. Computer information has also been compiled regarding hazardous waste storage.

B. Workforce Profile

The Division of Solid Waste Control requires local county health departments to prepare and update solid waste management plans each year. The Division reviews the county plans and requires public hearings before permits are granted. The staff also inspects sanitary landfills and monitor the water around the landfilling site. The Division provides advice and assistance to the local county health departments on a case-by-case basis. About 90 percent of the solid waste in the state is managed by county governments. There has not been much rural participation in the development of solid waste management as of yet. Local health departments also perform monitoring tasks for the Division by collecting samples near the sites in their jurisdiction.

The Division is composed of four sections: Sanitary Landfill Section, Sewage Sludege Section, Hazardous Waste Section, and Solid Waste Planning Section. The professional staff includes seven sanitarians, including the Chief of the Division. A sanitarian position requires a degree in either the physical or the biological sciences. There are four public health engineers on the Division staff with backgrounds in civil engineering, chemical engineering, and electrical engineering.

The Division also has one technician (a CETA employee), and two geologists on its professional staff. Clerical support is provided by an office secretary and two stenographer-clerks. The Division also has an EPA assignee (geologist) on loan to its staff until April, 1977. The total workforce of the Division is depicted in the following table.

TABLE X

STATE OF MARYLAND

Department of Health and Mental Hygiene
Division of Solid Waste Control
Current (1976) Staffing Level

Position	1976
Engineer	4
Geologist	1
Sanitarian	7
Other	5*
TOTAL	17

*Includes one CETA employee and an EPA geologist.

The Water Resources Administration has a total of five persons involved in hazardous waste management. These positions are filled by staff geologists or planners.

The Baltimore City Pyrolysis Resource Recovery Solid Waste Management System has a staff of thirty-five to operate and maintain the facility. The current workforce, by position, is listed in the following table.

TABLE XI

STATE OF MARYLAND

Pyrolysis Resource Recovery Solid Waste
Current (1976) Staffing Level

Position	1976
Administrator	5
Chief Operator	5
Field Operator	5
Mechanic	3
Electrician	2
Welder	2
Motor Vehicle Operator	3
Equipment Operator	3
Laborer	6
Clerical	1
TOTAL	35

The City of Baltimore, in an effort to solve its solid waste disposal crisis and at the same time recover resources on a large scale, has started up a LANDGARD Pyrolysis Resource Recovery Solid Waste Management System, developed by Monsanto Enviro-Chem Systems, Inc. The plant is designed to have a capacity of 1,000 tons per day when operating on a 24-hour basis. The plant is to eventually have a staff of 50 persons for operation and maintenance.

A $7 million grant was awarded to the City of Baltimore by the U.S. Environmental Protection Agency. An additional $4 million grant was awarded by the Maryland Environmental Service. These funds are for the express purpose of funding resource recovery systems. Reimbursement to the state for these funds will be made directly from the proceeds received from the sale of steam, glassy aggregate and ferrous metals. The City of Baltimore has provided the remaining funds..

There are twenty-three county health departments involved in solid waste management activities, including the City of Baltimore which disposes of 10 percent of the state's solid waste. Counties such as Baltimore and Montgomery have full-time personnel designated for solid waste management and Division officials estimate that there are between 30 to 40 full-time sanitarians or engineers working in the field. There is approximately one engineer for every four sanitarians included in this figure.

Division officials stated that as of February, 1977, there are 213 people engaged in the supervision and operation of sanitary landfills in Maryland. Of this total, 37 are supervisors, 154 are operators, 17 are weighmasters and five are watchmen. Based on the preceding information, it is estimated that there are between 300 to 400 persons involved in the management of solid or hazardous waste materials in both the public and private sectors in the State of Maryland.

C. Workforce Projections

Workforce projections for solid waste management activities in the State of Maryland are based upon the professional judgements of the Division's administrative officials.

It is anticipated that the new Federal Resource Conservation and Recovery Act will principally impact the staff growth potential of two regulatory state agencies: the Division of Solid Waste Control and the Water Resources Administration. Both are expected to increase in staff and functions as a result of increased federal funding for the management of hazardous waste materials.

Overall, there is not expected to be much growth in the solid waste management field as opposed to hazardous waste management over the next five years. The Division's Sewage Sludge Section is expected to increase in staff with the availability of state funds. There is expected to be a growing need for chemists, chemical engineers, environmental health aides and more emphasis to be placed on the hiring of geologists by the Division. Division officials plan to hire two chemical engineers with federal funds for the Hazardous Waste Section by July, 1977. An additional geologist, a chemist and a civil engineer are expected to be hired during Fiscal Year 1978.

The Sewage Sludge Section will receive one public health engineer (a civil engineer) and an additional sanitarian with state funds within the next year. The Landfill Section is to receive one public health engineer within the next two years and an environmental health aide and a sanitarian between 1978-1981. The Hazardous Waste Section is likely to expand the most with the addition of three public health engineers, one geologist and one sanitarian in the next five years. The staffing increases as projected by Division officials is depicted in the following table and are estimates:

TABLE XII

DEPARTMENT OF HEALTH AND MENTAL HYGIENE

Division of Solid Waste Control
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Engineer	4	8	9	9	9	9	23%
Geologist	1	1	2	2	2	2	n/a
Chemist	0	0	0	1	1	1	n/a
Sanitarian	7	7	8	9	10	10	8%
Technician	0	1	1	2	2	3	30%
Other	5	6	6	7	7	7	7%
TOTAL	17	23	26	30	31	32	13%

The Water Resources Administration may receive an additional ten planners over the next five years for the management of hazardous wastes which may affect their water quality monitoring studies in the conduct of river basin planning.

The Division staff are currently considering twenty-six proposed county landfill sites and, once the sites are approved, additional personnel will be hired. However, many of the present landfill operators currently employed also work at more than one site and the same situation is likely to occur for the proposed new sites. The Landfill Section within the Division of Solid Waste Control has requested three environmental health aides to monitor the existing county sites and it is likely that at least one such position will be actually obtained within the next five years by the Division.

D. Training and Certification

The Division of Solid Waste Control does not offer a formal in-house training program for staff employees but have provided training for landfill operators through a grant obtained by EPA. The training program is a short course that is held at Essex Community College. The Division has worked with the College in assisting in the development of the training program. The course is offered every year for both solid waste supervisors and operators at sanitary landfills; information concerning hazardous waste management is also presented.

The Division has recruited personnel from the University of West Virginia; however, the University of Maryland and the Johns Hopkins School of Public Health, according to Division officials, are the only known academic institutions which include a minimum solid waste management instruction course in environmental engineering programs.

E. Career Potential

Division officials anticipate that the career potential in the solid or hazardous waste management field will be in the private sector in the next five year period. Approximately 26 new sanitary landfills are expected to be constructed in the near future, thus creating a demand for bulldozer operators. Industrial chemical plants will also need additional chemists or chemical engineers. There is also expected to be a greater career potential for engineers (civil and chemical) and sanitarians in the Division of Solid Waste Control as a result of the passage of the Federal Resource Conservation and Recovery Act.

F. Conclusion

While the solid waste program in Maryland is anticipated to grow by some 15 professional positions, the magnitude of the RCRA legislation and the ongoing activiites, e.g., resource recovery and conversion, suggest that the agency staff may still be undermanned. At the local level, refuse disposal will demand higher skilled positions and finally a certification program, which will then identify workforce levels. Collection activities may require some cursory training in materials handling but workforce levels, if anything, will decline due to coalescence of smaller firms and multi-county or regional disposal systems.

Resource recovery and energy conversion efforts will offer jobs, e.g., a pyrolysis plant may employ up to fifty people operating on a 24 hour basis. New legislation RCRA of 1976 will doubtless bring federal funding and with it more jobs. Still, careers in the field will depend on the economics of solid waste management, which is to say, the private sector will have to become more actively involved in solid waste activities. Otherwise, the field will offer a few new positions to meet federal/state guidelines and the collection and disposal effort will continue to fluctuate but show little concerted growth.

VII. WASTEWATER

A. Introduction

The U.S. Environmental Protection Agency (EPA) has delegated certain responsibilities entrusted to it by Congress's passage of the Water Pollution Control Act Amendments of 1972. These responsibilities include review authority over plans and specifications for facility construction projections, review authority over operation and maintenance (O & M), manual preparation, review authority over change orders, and the National Pollutant Discharge Elimination System (NPDES) permitting program which has also been delegated to Maryland. However, these responsibilities are currently divided between two state agencies in Maryland: the Department of Public Health and Mental Hygiene (Environmental Health Administration) and the Department of Natural Resources (Water Resources Administration). Attempts have been made to consolidate the environmental program responsibilities acquired by these two separate departments into one agency, but so far these attempts have been unsuccessful.

The Department of Natural Resources (DNR) Water Resources Administration has authority for the issuance of NPDES permits and for 303E River Basin Planning;whereas the Environmental Health Administration (EHA), a part of the Public Health Department, has authority over the other water quality assurance programs mandated under the Federal Act. There is some duplication of effort between the two state agencies as DNR has the authority to issue discharge permits and EHA develops plans and specifications for the construction grants program and conducts monitoring tasks.

Both the Environmental Health Administration and the Water Resources Administration are expected to substantially increase their staffing level over the next five years. The Environmental Health Administration's water quality program is expected to increase as additional personnel will be recruited to complement the Division of Planning and Compliance and the Construction Grants Unit. The Maryland Board of Public Works has approved the delegation of EPA responsibilities for the review and approval of construction grants wastewater treatment plant facilities. The Water Resources Administration will require additional positions to implement responsibilities assigned to it resulting from state enactment of a Hazardous Substances Act, the implementation of a Flood Control Program and a surface mine regulatory program. Personnel are needed for preparation of storm sewer permitting.

In Maryland, the State Board of Certification certifies wastewater treatment plants, water treatment plant and industrial treatment plant operators. There are a total of approximately 1,800 certified treatment plant operators in Maryland of which about half are wastewater treatment plant operators.

B. Workforce Profile

The Environmental Health Administration has responsibilities for the following wastewater pollution control and abatement functions:

1) Review of plans and specifications;
2) Review and planning of comprehensive county plans;
3) Facility Planning;
4) Review of engineering plans;
5) Construction facility inspections to ensure proper maintenance and operations.

Wastewater pollution control and abatement responsibilities are located under the Environmental Health Administration's Bureau of Sanitary Engineering. This Bureau is composed of a Construction Grants Unit, a Division of General Sanitation, a Division of Planning and Compliance, a Division of Solid Waste and a Division of Water and Sewerage.

The Bureau of Sanitary Engineering's Construction Grants Unit is composed of a Technical Liaison staff and an Administrative and Fiscal Unit which performs interim construction reviews of construction plans. Staff conduct needs surveys through the preparation of comprehensive water and sewage plans (208 Planning) and ascertain the needs of the state's counties and the Bureau's Division operating sections. Grants Unit staff also prepare O & M manuals and ensure that all planning needs are met by reviewing engineering plant designs and specifications.

The Division of Planning and Compliance develops comprehensive water and sewage plans. The Division is composed of a Comprehensive Planning Section, an Applications and Permits Section and a Compliance and Monitoring Section. The Division of Water and Sewage inspects treatment plant facilities and is composed of a Water Section, a Sewer Section, an Operations Section and a Technical Review Section. The Division of General Sanitation has a Water Quality Monitoring Section and a Shellfish Water Section which has wastewater pollution control and abatement functions. The Division of Solid Waste Control has a Sewage Sludge section which assists treatment plants in handling sludge materials. It has been suggested that Bureau staffing capabilities should be integrated with Water Resources Administration staff for better compliance control. The following table depicts, as of July, 1976, the staffing profile of the Bureau's wastewater pollution control personnel.

TABLE XIII[1]

DEPARTMENT OF PUBLIC HEALTH AND MENTAL HYGIENE

Bureau of Sanitary Engineering
Current (1976) Staffing Level

Position	1976
Engineer	21
Technician[2]	1
Sanitarian	5
Other[3]	28
TOTAL	55

[1]Excludes Water Section, Residential Sanitarian Section, Recreational Sanitation Section, Sanitary Landfill Section, Hazardous Waste Section, and Solid Waste Planning Section personnel.

[2]One Laboratory Aide.

[3]Includes Administrators, Clerical and other personnel.

The Department of Natural Resources' Water Resources Administration is currently staffed with a total of 127 persons who have water quality or wastewater pollution control and abatement responsibilities. The staff are located in Enforcement, Permits and Technical Services Sections. The director is assisted by a program advisor to EPA, a legal staff, a deputy director for administration and a deputy director for operations. Enforcement section personnel are located in five regional offices and an Oil Control sub-section. Five sub-branches are included in the Permit Section: Wetlands, Hazardous and Industrial Wastes, Municipal Dischargers, Water Supply, and Watershed. The Technical Services Section has laboratory services, water quality services, flood control and planning sub-sections.

The EPA Regional Office program officials consider this organization to be highly efficient but they have suggested that their field inspectors should be required to use EMS check lists and other procedures. The total staff of the Water Resources Administration is depicted below.

TABLE XIV

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Water Resources Administration
Current (1976) Staffing Level

Position	1976
Engineer	30
Geologist	9
Chemist	7
Attorney	3
Scientist	1
Planner[1]	11
Biologist	28
Technician	34
Other[2]	4
TOTAL	127

[1]Natural Resource Planners.
[2]Administrators and clerical.

The Environmental Health Administration recruits civil, sanitary, and chemical engineers as public health engineers. Technicians employed are classified as environmental health aides. Sanitarians usually have a Bachelor of Science degree or an Associate Degree with a specified number of accredited hours in the physical sciences for entry level positions. Recruitment is handled through the State Merit System.

The Water Resources Administration employs natural resources planners with Master Degrees in an environmental policy area and water resource engineers with specialization in sanitary engineering. Civil Engineers are employed to inspect ongoing water distribution system construction. Inspectors have either a high school education or an Associate Degree plus experience.

The Maryland Board of Certification certifies wastewater treatment plant operators along with water treatment and industrial treatment plant operators. According to state officials, there are 363 water treatment and 352 wastewater treatment plants in Maryland and most are municipal plants. The following table depicts the total number of certified treatment plant personnel in Maryland.

TABLE XV

STATE OF MARYLAND

Certified Treatment Plant Operators
Current (1976) Staffing Level

Classification	1976
A	100
B	200
C	750
D	750
TOTAL	1,800

It is estimated that there are 800 certified wastewater, 700 water and 300 industrial treatement plant operators in Maryland at the present time. Specific breakdowns were unobtainable from state officials. The plants are classified on the basis of size and complexity with A being the highest and D the lowest sized classification.

The Department of Natural Resources inspects industrial treatment plants in Maryland and the Environmental Health Administration inspects the rest.

The Department of Natural Resources, Environmental Manpower and Education Unit, recently released a study based on a survey taken in wastewater treatment plants in the state. The study was published in

October, 1976, and is entitled, "Manpower Needs Survey: Wastewater". It is an updated summary of municipal wastewater treatment facilities which was based on mailings of information requested of 352 wastewater plants. A total of 165 or 44 percent of all wastewater treatment facilities responded to the request. The Department reached the following conclusions:

1) The workforce has increased by 58% and, due to construction and increased staffing demands, the staff will continue to increase. This increase in workforce is creating unprecedented demand for entry level positions as well as skill improvement training.

2) The age of the current workforce is an important consideration for manpower training. It can be safely stated that anyone now in their sixties will be retiring in the next four to six years; and those in their fifties will retire in the next five to ten years. Analysis of those surveyed indicates a high turnover due to the age factor alone. Giving consideration to additional factors of death, transfers out of the industry and new jobs based on new construction and expanded facilities, individuals who enter the industry over the next five years and receive good training should accelerate upward in career advancement.

3) Training programs for staff of wastewater treatment facilities should emphasize adult remedial education due to the education levels since 34 percent surveyed have less than a high school education.

4) Earnings in this industry continue to lag; however, improvement has been the trend over the past three years.

Based on new and existing legislation there will continue to be increased demands for qualified plant personnel. It is anticipated salaries will show a marked increase in the coming years.

The current wastewater workforce of 851 persons as compared to 740 on staff full-time three years ago is an increase of 13 percent. The increase in the workforce over this period indicates a need for upgrade and skill improvement training if facilities are to be effectively, safely, and efficiently operated.

The following table depicts the number and occupational categories of employees working in the wastewater field.

TABLE XVI

STATE OF MARYLAND

Current (1976) Wastewater Workforce

Positions	Total Staff	% of Total
Superintendent	263	31.0%
Asst. Superintendent	55	6.4%
Operations Supervisor	37	4.3%
Foreman	37	4.3%
Sole Operator	41	4.8%
Operator I	170	20.1%
Operator II	37	4.3%
Skilled Mechanic	55	6.5%
Laborer	104	12.2%
Chemist	24	2.8%
Other	28	3.3%
TOTAL	851	100.0%

Analysis of the data in the preceding table indicates that approximately 52 percent of the individuals listed as superintendents are employed in facilities with a staff of five or less which indicates that the term "working superintendent" is more nearly correct; these individuals function as Superintendent/Operator II. This would change the above table to read 136 Superintendent (15.9%) and 164 Operator II (19.3%).

C. Workforce Projections

Both the Environmental Health Administration and the Water Resources Administration are projected by program administrators to significantly expand their staffing level over the next five years because of the impact of new federal and state legislation. Administrators of the Environmental Health Administration projected that approximately twenty-five additional engineering personnel will be required to assist present personnel assigned to the Construction Grants Unit through Fiscal Year 1981. The budget submitted for Fiscal Year 1978 includes a request for fourteen additional personnel for the Sewer Facilities Construction Grants Program. Additional personnel include planners, engineers, sanitarians, clerical, administrative and one fiscal auditor.

The principal reason for such dramatic growth is that approval has been obtained to hire additional personnel from the Maryland Board of Public Works which approved the delegating of EPA responsibilities for the review and approval of construction grants of wastewater treatment facilities. Also, the Division of Water and Sewage and the Division of Planning and Compliance wastewater activities will require additional personnel. An additional eight to ten personnel in construction/grants may be required beyond Fiscal Year 1977 to complement the staff of other divisions.

If the Environmental Health Administration receives further responsibilities from EPA for the certification and processing of grants, Maryland may adopt the California system of charging one-half of one percent under the federal grant for administrative costs. If this and other areas are delegated to the state, then the charges assessed will be

greater and more personnel may be hired. The following is an approximation of the workforce projections by Environmental Health Administration officials for wastewater pollution control and abatement activities.

TABLE XVII

MARYLAND DEPARTMENT OF PUBLIC HEALTH AND MENTAL HYGIENE

Wastewater Program Operations
Projected Staffing Level to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	21	30	32	33	33	34	5%	11%
Technician	1	1	2	2	3	3	n/a	30%
Sanitarian	5	11	11	12	13	13	n/a	27%
Other	28	31	31	32	33	33	n/a	3%
TOTAL	55	73	76	79	82	83	5%	9%

Turnover is greatest among the engineering positions because of the salaries which are available in the federal government and in the private sector. Turnover annually averages between four to five percent and there is very little or non-existent turnover among the sanitarian positions.

The Water Resources Administration's officials project that by 1982 their staffing level will increase from 127 to 168 classified positions. Although the state's permit issuance is almost complete and most companies will be in compliance with schedules, additional staff are needed to ensure construction grant compliance and to implement new state legislation. For FY 1978, the Administration has requested an additional 20 positions on a full-time non-conditional employment basis. An additional 20 people are expected to be employed by other means such as on a contractual or part-time basis.

Because of the New Hazardous Substances Act (Maryland), which includes a special fund, additional chemists and public health engineers

will be recruited. At least six new positions will be authorized because of this new Act. The Flood Control Act of 1976 authorized the Water Resources Management Administration to recruit eight new positions with $100,000 for Fiscal Year 1978. The Surface Mining Act of 1975 included a special fund authorizing employment of two engineers and one to two technicians by the Water Resources Administration. If more "208" money becomes available from EPA, then more water resources planners may be recruited.

There is a possibility that the Department of Natural Resources will initiate a permit fee system to charge users for administrative services rendered as EPA grant allocations are anticipated to remain near the present level. The projections made by Administration officials are depicted in the following table.

TABLE XVIII

STATE OF MARYLAND

Water Resources Administration
Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth (average)
Engineer	30	39	41	41	43	44	6%	2%
Attorney	3	3	3	4	4	4	n/a	6%
Chemist	7	11	12	13	13	13	n/a	15%
Biologist	28	28	29	30	30	32	n/a	2%
Geologist	9	9	9	10	10	11	n/a	4%
Planner	11	11	11	12	12	12	n/a	2%
Scientist	1	1	1	1	1	1	n/a	0
Technician	34	40	40	43	44	45	n/a	6%
Other	4	4	4	5	5	6	n/a	9%
TOTAL	127	146	150	159	162	168	6%	6%

Based on the number of treatment plants that are currently being constructed, expanded and upgraded, Board of Certification officials project that there will be 3,000 certified operators in Maryland by 1982 (there are now about 1,800). This figure includes new drinking water systems which will require certification and new wastewater treatment plants. Officials were unable to provide a breakdown of expected numbers of water treatment, water treatment plant, and industrial treatment plant operators needing certification. There are many small water systems which currently do not have certified operators and many wastewater treatment plants do not have a certified operator on station twenty-four hours a day. Program administrators estimate that 240 operators will enter the field each year and also that 450 operators need upgrade training annually. Based on such projections and assuming that the lowest class (D) will grow the most and the highest class (A) will grow the least, the following is an approximation of projected numbers of operators that may be certified by 1982:

TABLE XIX

STATE OF MARYLAND

Treatment Plant Operators
Potable Water/Wastewater
Workforce Projections to 1982 (est.)

Classification	1976	1977	1978	1979	1980	1981	%/annum growth (average)
A	100	120	140	160	180	200	14%
B	200	240	280	320	360	400	14%
C	750	830	910	990	1,070	1,150	8%
D	750	850	950	1,050	1,150	1,250	10%
TOTAL	1,800	2,040	2,280	2,520	2,760	3,000	10%

D. Training and Certification

Staff professionals of the Environmental Health Administration receive on-the-job training through a program which periodically rotates persons between divisions. This program enables personnel to familiarize themselves with Bureau functions in other areas. The Administration employs two training specialists to manage training programs for in-house staff, local health department officials, and treatment plant operators. Six Environmental Health Administration staff professionals attended training courses part-time through EPA fellowship grants during Fiscal Year 1976.

The Water Resources Administration (WRA) staff attend management training offered by the Department of Personnel. Also, approximately one-fourth of Administration personnel attend training courses on their own time. Maryland pays one-half of any tuition fees. Nine other WRA personnel attended EPA fellowship training courses in 1976.

EPA has loaned a training specialist to the Department of Natural Resources. This person carries the position of Director of the Office of Manpower and Education. The EPA assignee assisted in the training of 158 wastewater treatment plant operators and eighty-five and sixty-four were trained, respectively, under two educational grant programs. Some of the training has been contracted to private firms, municipalities, community colleges, and private industry representatives. Courses in sanitary technology are offered at Charles County, Hagerstown and Salisbury Community Colleges. These courses are funded by the Maryland Department of Health and Mental Hygiene. Additionally, a total of thirty-eight persons from Maryland attended EPA courses offered by the National Training Center in Cincinnati during Fiscal Year 1976.

Recently, the State of Maryland established an advisory committee to provide advice concerning training needs for water and wastewater treatment plant operators and solid waste management personnel. It consists of sixteen members made up of local operators, training officials, consultants and academicians from both community colleges and universities. The advisory committee addresses basic, intermediate and advanced training needs.

Basic treatment plant operator training is now readily available in Maryland. Fifteen week (45 hour) courses for wastewater and water treatment plant operators are offered at local community colleges in six locations. One session is for water plant operators and is alternated with a program for waste treatment plant operators. In 1976, 400 operators attended these courses in four locations. In 1977, the state intends to add two additional courses and 240 more attendees are expected. Continuing education credits (CEU's) may be required for operators to be certified in the future as mandatory certification has now become the national trend. Sixteen basic courses are offered annually with an average attendance of 300. Also, sixteen advanced courses are offered at which about 600 students attend annually. Over 900 individuals have received more than 1,200 contact hours of training during Fiscal Year 1976.

In sum, Maryland's operators need training to enable them to be certified in Class A through D in any process flow technology. The training needs to emphasize the full range of treatment processes.

E. Career Potential

No new or unique career positions were identified to be emerging in the wastewater pollution control field over the next five years. The Environmental Health Administration is actively recruiting chemists, engineers and sanitarians for construction grants review program. The Water Resources Administration is also recruiting additional chemists and public health engineers to complement the staff due to the recent passage of state legislation dealing with flood control, hazardous waste and surface mining.

It is also evident that the construction grants program will create a demand for qualified certified operators to operate these relatively complex treatment facilities. The wastewater treatment plant workforce has increased by 58% over the last three years. Many present operators are expected to retire within the next four to six years, thus creating a demand for additional operator personnel.

F. Conclusion

The State of Maryland wastewater pollution control and abatement regulatory program is divided among two state agencies: the Environmental Health Administration (Department of Health) and the Water Resources Administration (Department of Natural Resources). The Environmental Health Administration is responsible for reviewing and approving construction grant plans and inspecting them to ensure that they conform to design specifications. The Department of Natural Resources has responsibility for the NPDES permitting program and for river basin planning functions.

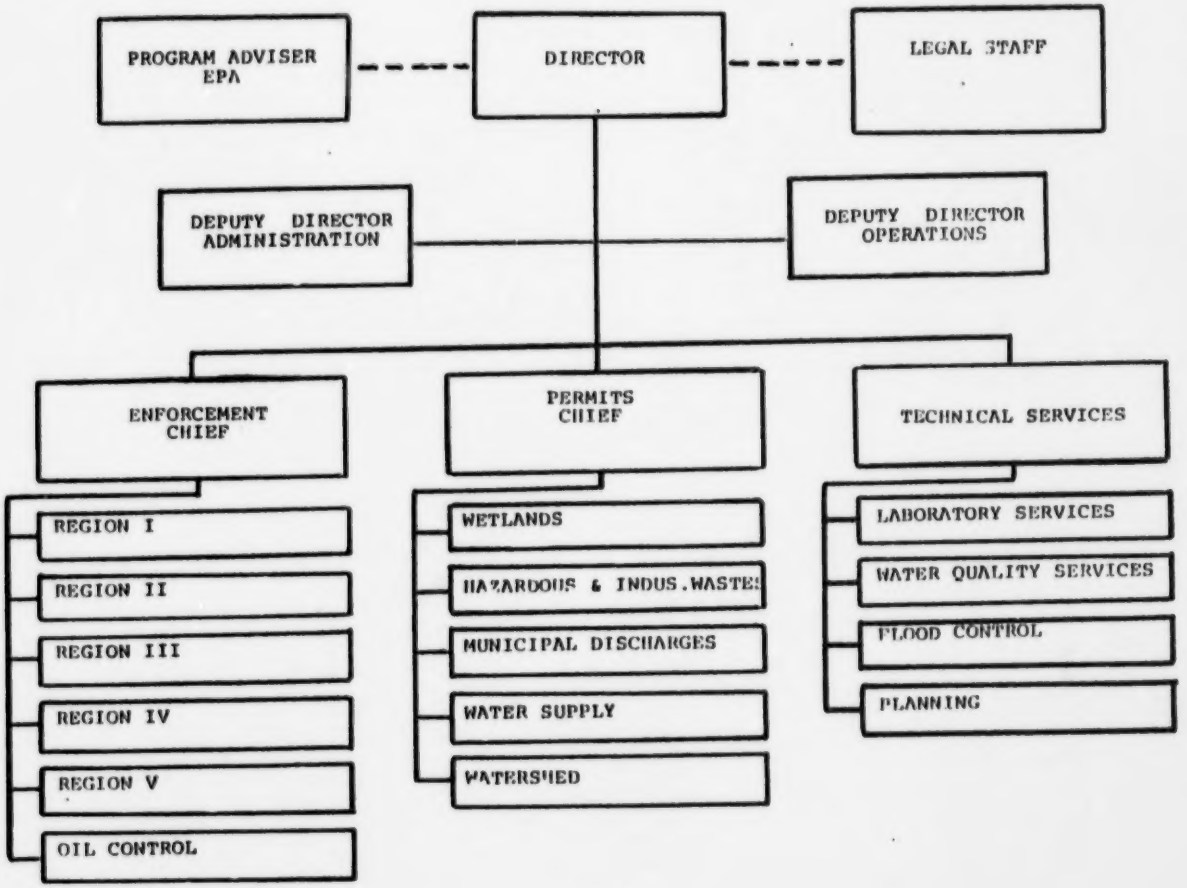
Both agencies expect significant staffing growth over the next few years. The Environmental Health Administration is recruiting personnel to complement the present reviewing capabilities of the Construction Grant Unit. The Water Resources Management office is recruiting personnel to meet guidelines established by state legislative initiatives.

Training and certification at present is primarily state supported. Some EPA fellowship grants have been utilized by both state agencies; however, training is not adequate to fulfill present upgrading of staff needs. State officials expect that by 1978 many wastewater treatment plants will become operational although they are now at Step I and II level in the construction grants program. It becomes evident, then, that training requirements should be met prior to these facilities becoming operational.

Career potential appears brightest for chemists, engineers (sanitry, civil, and chemical), and sanitarians in Maryland over the next five years. The state's municipalities and private treatment plant owners need to consider providing the operating staffs with more incentive to obtain upgrading in their capabilities. Many of the experienced operators will be retiring in the next five years, therefore, training of qualified replacements is essential.

Figure 3

MARYLAND DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES ADMINISTRATION



VIII. ENERGY

A. Introduction

The Maryland Energy Policy Office was established by Executive Order of the Governor to allocate petroleum products according to the federal mandatory petroleum allocation program. The Energy Policy Office has the following other purposes:

1) to provide planning and technical assistance;

2) to research methods of energy conservation for industry, commerce, and for the general public;

3) to provide public information and education on energy matters; and,

4) to maintain an inventory status of available fuels including the state set-aside supplies.

In July 1977, the Maryland Energy Policy Office tends to undergo a reorganization and to become part of the Maryland Department of Natural Resources. This reorganization thus casts some uncertainty on whether or not the entire present office staff will remain the same under that Department's jurisdiction. Other energy policy and management agencies in Maryland are the Energy Mining and Coastal Zone Management Administration, which control energy power plant siting, and the Department of State Planning, which evaluates and prepares environmental impact assessments.

The major program undertaken by the Maryland Energy Policy Office include:

1) Inventory and Fuel Distribution Monitoring System;

2) Fuel allocation;

3) Contingency and long-range planning;

4) Public information and education;

5) Supply and demand studies;

6) Energy conservation program;

7) Energy research and demonstration projects; and,

8) Energy Information System.

Maryland currently has two nuclear power plants in operation, located at Lasby. Both are pressurized water reactors with a total capacity of 845,000 kilowatts. They are operated and maintained by Baltimore Gas and Electric Company. The first unit came into operation in 1975, and the second in 1977, but the second reactor may not yet be under full power. Two more nuclear reactors are planned to be operational in 1985 and 1987 at Douglas Point. They will have a total generating capacity of 1,178,000 kilowatts. Both are boiling water reactors and are to be constructed by Potomac Electric Power Company. These units are currently under the review process for authorization of construction permits.

B. Workforce Profile

The Maryland Energy Policy Office currently has 12 authorized positions; however, two positions remain unfilled at this time. The staffing level of the Energy Policy Office is depicted in the following table.

TABLE XX

STATE OF MARYLAND

Energy Policy Office
Current (1976) Staffing Level

Position	1976
Director	1
Allocations Officer	1
Public Information Officer	1
Planner	2
Business Administrator	1
Computer Operator	1
Administrative Aide	2
Secretary	1
TOTAL	10

C. Workforce Projections

Workforce projections for the Maryland Energy Policy Office are based upon the professional estimates of the Office's administrative officials. It is anticipated that the Energy Policy Office will have to expand its present staff if it is to handle the programs which it has obtained. Most of the program expansion will be based upon federal grant money. For example, an Energy Savers Program to reduce consumption within the state has been funded by federal agencies. Also, Office officials anticipate that its Solar Energy grant will soon be funded.

Program administrators anticipate that eight additional personnel may be hired in 1977 to implement additional project responsibilities that have been recently acquired. In order to implement the solar

energy research and development grant, three or four engineers may be recruited. At least one of these engineers must have expertise in solar development projects or systems. In addition, a public information officer and several administrative support personnel may also be recruited. Projections beyond 1977 were unobtainable due to reorganization uncertainty.

D. Training and Certification

Staff of the Energy Policy Office do not participate in any state-sponsored training or educational programs. However, they do attend conferences or short courses offered by institutions such as the University of Maryland at their own expense.

E. Career Potential

It appears that engineers with experience in the development of solar energy systems will have the best potential of finding employment in the Energy Policy Office in the foreseeable future. As the workforce in this field is still rather limited and underdeveloped, the hiring of engineering personnel with expertise in other engineering areas may result.

F. Conclusion

The Maryland Energy Policy Office is expected to undergo a reorganization to become part of the Maryland Department of Natural Resources.

The Office has been primarily involved in energy allocation and conservation planning in the past, but is expected to acquire further responsiblities in such areas as the development of solar energy technology.

Because of this anticipated acquisition of grants to conduct studies concerning solar energy, the Office may recruit engineering personnel with particular expertise in that field if they are available. In any case, career potential appears to be best for engineers at the present time. An additional public information officer may also be recruited to increase the Office's public visibility and liaison with educational facilities.

Two more nuclear power reactors are currently being planned to be operational in Maryland at Douglas Point by 1985 and 1987. The construction of these facilities will have a long-term impact upon the workforce associated with nuclear energy production.

Selected Post Secondary Institutions With Formal Environmental Energy Programs

While environmental education career options are not extensively available in Maryland, several programs are currently offered in both community colleges and state colleges and universities. A Master of Science program in Environmental Renewable Resources is awarded through Frostburg State College. In addition, the University of Maryland at College Park is developing two advanced degree programs in Marine and Estuary Environmental Science. The University projects that by 1978 both a Masters and Doctoral program will be offered.

The University of Maryland Eastern Shore implemented a Bachelor of Science program in Environmental Sciences during 1977. Due to the locale of the University, several courses are being developed in marine biology and oceanography. The basic science program is being revised to include special emphasis on environmental concepts.

Three community colleges have environmental curricula: Garrett Community College, Charles County Community College, and Community College of Baltimore. Garrett Community College offers an A.A. degree in Estuarine Resource Technology. An Associate of Arts degree in Pollution Abatement Technology is awarded through Charles County Community College. The Pollution Program provides a directed curriculum in air, wastewater, and solid waste pollution control management, as well as a general exposure to environmental health and fundamental laboratory techniques. This program has been functional since 1968.

The Community College of Baltimore offers an Associate degree in Environmental Health Technology. Students may elect one of two available

program options: 1) Environmental Sanitation and 2) Air Pollution Monitoring. Both options include a survey of general science and mathematic courses. In addition, both programs require that the students enroll in English and Technical Writing core courses. The Environmental Sanitation Option stresses fundamentals of environmental health and scientific analysis. The Air Pollution Monitoring Option emphasizes air, solid waste, and radiation health concepts.

While most post-secondary institutions in the state offer select courses in environmental disciplines through their existing departmental structure, no attempt has been made to complete a survey of such courses in this phase of the project.

The following section of this report will provide a basic review of the environmental programs available through University of Maryland Eastern Shore, Community College of Baltimore, and Charles County Community College. The review will include statistics on student enrollment, degree requirements, and course offerings.

SENIOR INSTITUTIONS

University of Maryland Eastern Shore
Princess Anne, Maryland

Program: Environmental Sciences (B.S.)

Hours required for major: Semester - 132
Program Inception: 1977
Staff Size: One professor, two associate professors, four assistant professors (6 Ph.D., 1 M.S.)
Enrollment: 7 pre-registrants
Graduates (1976): not applicable
Placement: not applicable
Graduate Work: not applicable

Courses

English
Mathematics
History
Chemistry
Biology
Computer Science
Physics
Health Education
Environmental Science
Environmental Science Seminar
Environmental Research
Marine Biology
Atmospheric Science
Society, Science, and Environment
Oceanography
Environmental Physics
Environmental Chemistry
Geology
Biochemistry

COMMUNITY COLLEGES/TECHNICAL INSTITUTIONS

Community College of Baltimore
Baltimore, Maryland

Program: Environmental Health Technology (A.A.)

Hours required for major: Semester - 60
Program Inception: 1976
Staff Size: Two instructors (Minimum of B.S. degree)
Enrollment: 5
Graduates (1976): 0
Placement: 0
Graduate Work: 0

Courses - Environmental Sanitation Option

General Chemistry I, II
General Biology
Technical Mathematics
Introductory Sociology
English Writing
Physical Fitness and Health
Principles of Ecology
Environmental Science
Technical Writing
Milk and Food Processing Sanitation
Environmental Health Administration
Sanitary Land Fill Operation
Microbiology
Fundamentals of Data Processing
Modern Elementary Statistics or Introduction to Computing with Fortran
Environmental Chemistry
The World as an Eco-System

Courses - Air Pollution Monitoring Option

General Chemistry I, II
General Biology
Technical Mathematics
Introductory Sociology
English Writing
Physical Fitness and Health
Principles of Ecology
Environmental Science
Technical Writing
Environmental Health Administration
Sanitary Land Fill Operation
Introduction to Meteorology
Air Pollution, Radiation Health Problems
Environmental Chemistry
Fundamentals of Data Processing or Modern Elementary Statistics
The World as an Eco-System

COMMUNITY COLLEGES/TECHNICAL INSTITUTIONS

Charles County Community College
LaPlata, Maryland

Program: Pollution Abatement Technology (A.A.)

Hours required for major: Quarter - 72
Program Inception: 1968
Staff Size: Four instructors.
Enrollment: 35
Graduates (1976): 10 (estimate)
Placement: approximately 60%
Graduate Work: no available information

Courses

Introduction to Environmental Health
Air Pollution Program & Properties
Wastewater Unit Operations I
Fundamentals of Incineration
Fundamentals of Sanitary Landfill Operation
Rural Pollution
Plant Practicum
Pollution, Man, and the Environment
Plant Engineering Maintenance
Environmental Technical Laboratory
Industrial Waste Control and Management
Solid Waste Management and Macropollution
Directed Studies Course in Pollution Abatement Technology

State Legislation

MARYLAND GENERAL

TITLE:

Environmental Policy Act
Maryland Code NR 1-301

PURPOSE:

To protect and enhance the state's environment, and to coordinate the environmental policies of all state agencies.

DEFINITIONS:

1. Environmental effects report
2. Proposed state action
3. Historic resources
4. State agencies

ADMINISTERING AUTHORITY:

All State Agencies
Department of Natural Resources

AUTHORIZATIONS:

To consider environmental amenities in state actions;
To prepare and submit environmental effects reports for proposed actions;
To issue guidelines for and approve reports submitted.

MARYLAND GENERAL

TITLE:

Environmental Service Act
Maryland Code NR 3-101

PURPOSE:

To provide for dependable and efficient water supply and water purification and disposal of liquid and solid wastes.

DEFINITIONS:

1. Cost
2. County
3. Director
4. Facility
5. Liquid waste
6. Municipality
7. Person
8. Project
9. Service
10. Service district
11. Service region
12. Solid waste disposal project
13. Solid wastes
14. Waste water purification project
15. Water supply project

ADMINISTERING AUTHORITY:

Department of Natural Resources
Maryland Environmental Service

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To construct and operate facilities within the state;
To make plans and studies regarding water supply and purification, and liquid and solid wastes;
To establish various service regions and prepare five year plans therefor;
To have general responsibility for carrying out five-year plans.

PROHIBITED ACTS:

To violate any act provision or rule issued thereunder.

PENALTIES:

Fines of up to $1,000.

MARYLAND AIR

TITLE:

Air Quality Control Act
Maryland Code 43-690

PURPOSE:

To maintain purity of the air resources of the state to protect the health, general welfare and property of the people of the state.

DEFINITIONS:

1. Air pollution
2. Board
3. Council
4. Department
5. Emergency
6. Person
7. Source

ADMINISTERING AUTHORITY:

Department of Health and Mental Hygiene
Air Quality Control Advisory Council

AUTHORIZATIONS:

To establish air quality standards for the six areas of the state;
To monitor air quality and enforce the standards;
To develop air pollution emergency contingency plans;
To issue regulations pursuant to the act;
To grant variances under the act;
To require registration of potential air pollution sources.

PROHIBITED ACTS:

To violate any act provision or rule issue pursuant thereto.

PENALTIES:

Fines of up to $10,000.

MARYLAND NOISE

TITLE:

Environmental Noise Control Act
Maryland Code 43-822

PURPOSE:

To coordinate a statewide program of noise abatement and control to protect the environment and the quality of life.

DEFINITIONS:

1. Department
2. Noise
3. Environmental noise
4. Environmental noise standards
5. Sound level limit
6. Source
7. Noise council
8. Political subdivision

ADMINISTERING AUTHORITY:

Department of Health and Mental Hygiene
Environmental Noise Advisory Council

AUTHORIZATIONS:

To establish ambient noise standards;
To develop plans to attain noise standards;
To issue regulations pursuant to the act;
To coordinate noise control among state agencies;
To generally enforce the act.

PROHIBITED ACTS:

To violate any act provision or regulations issue pursuant thereto.

PENALTIES:

Fines of up to $10,000.

MARYLAND PESTICIDES

TITLE:

Pesticide Applicators Law
Maryland Code 5-201

PURPOSE:

To establish pesticide applicator categories and to control the use of restricted pesticides.

DEFINITIONS:

1. Application
2. Board
3. Certified applicator
4. Custom applicator
5. Defoliant
6. Desiccant
7. Device
8. General use pesticide
9. Pest
10. Pest control consultant
11. Pest control operator
12. Pesticide
13. Private applicator
14. Public agency applicator
15. Restricted use pesticide
16. Registered employee
17. Supervision

ADMINISTERING AUTHORITY:

Department of Agriculture
Pesticide Advisory Board

AUTHORIZATIONS:

To issue regulations pursuant to the act;
To generally enforce the act;
To classify pesticides and restrict their usage;
To enter and inspect property in enforcement of the act;
To license pesticide dealers;
To establish certification standards for applicators;

AUTHORIZATIONS (Cont'd):

To categorize commercial applicators;
To certify private and commercial applicators.

CERTIFICATION OR LICENSING:

Private applicators must be certified;
Commercial applicators must be licensed in one of eight categories;
Commercial applicators must have experience, education and pass examination to show competence.

PROHIBITED ACTS:

To engage in pesticide application business without license;
To fail to obtain proper certificate;
To violate other act provisions or regulations.

EXEMPTIONS:

Manual laborers under supervision.

PENALTIES:

Fines of up to $1,000 or 60 days imprisonment.

MARYLAND POTABLE WATER/WASTE WATER

TITLE:

Water Resources Law
Maryland Code 8-101

PURPOSE:

To provide for control of water resources of the state to ensure safe water supplies and to prevent pollution.

DEFINITIONS:

1. Administration
2. Appropriate county governing body
3. Board of review
4. County
5. Department
6. Director
7. Person
8. Pollution
9. Secretary
10. Waters of the state
11. Discharge
12. Disposal system
13. Effluent limitations
14. Industrial user
15. National pollutant discharge elimination system
16. Permit
17. Pollutant
18. Publically owned treatment works
19. Schedule of compliance
20. Water quality criteria
21. Water quality standards

ADMINISTERING AUTHORITY:

Department of Natural Resources
Water Resources Administration
Department of Health and Mental Hygiene

AUTHORIZATIONS:

To supervise natural resources of tidal waters;
To supervise development and conservation of water resources;
To conduct studies and surveys of state water resources;

AUTHORIZATIONS (Cont'd):

To issue permits for state water uses;
To issue permits for reservoirs, dams and other waterway obstructions;
To promote optimum utilization of state water resources;
To develop water pollution control plans;
To conduct studies and investigations regarding water pollution;
To adopt water quality and effluent limitation standards;
To approve disposal system construction plans;
To administer the state permit discharge program;
To issue regulation pursuant to the act;
To control oil transfer and storage operations.

PROHIBITED ACTS:

To violate the terms of any permit;
To fail to obtain a permit for use, discharge and other required activities;
To cause discharge of oil from any ship;
To violate any other act provision.

EXEMPTIONS:

No permit needed for limited domestic or agriculture water uses or small pond construction.

PENALTIES:

Water use violations - fines of up to $1,000 or one year imprisonment;
Water pollution violations - civil fines of up to $10,000; criminal fines of up to $25,000 or one year imprisonment;
Liability also imposed for oil spill damages.

MARYLAND WASTE WATER

TITLE:

Water Pollution Control Laws
Maryland Code 43-387

PURPOSE:

To provide for a program of water pollution control and for the certification of waterworks operating personnel.

DEFINITIONS:

1. Waters of the state
2. Sewage
3. Waterworks
4. Water supply
5. Water supply system
6. Sewage system
7. County plan
8. Community sewage system
9. Community water supply system
10. Department
11. Individual sewerage system
12. Individual water supply system
13. Lot
14. County
15. Potable water
16. Subdivision
17. Approving authority
18. Solid wastes
19. Solid waste disposal system
20. Solid waste acceptance facility
21. Waste waterworks
22. Industrial waste waterworks
23. Responsible charge
24. Superintendent

ADMINISTERING AUTHORITY:

State Department of Health
Water Resources Commission
Board of Certification

AUTHORIZATIONS:

To assist in the planning of basic sewerage system disposal facilities;
To supervise implementation of county sewerage and water supply plans;
To issue regulations regarding the control of water pollution;
To issue permits for landfill refuse disposal systems;
To issue order to control sources of water pollution;
To establish waterworks operator certification standards;
To classify all water and waste waterworks;
To certify waterworks and waste waterworks operators.

CERTIFICATION OR LICENSING:

All waterworks and waste waterworks must be under the supervision of a properly certified superintendent in a classification corresponding to that of the facility.

PROHIBITED ACTS:

To violate any order issued by the department;
To operate a waterworks or waste waterworks system without a properly certified superintendent.

PENALTIES:

Fines of from $10 to $500 per day;
Waterworks or waste waterworks violations - fines of $25.